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NEW YORK, SATURDAY, JUNE 15, 1918

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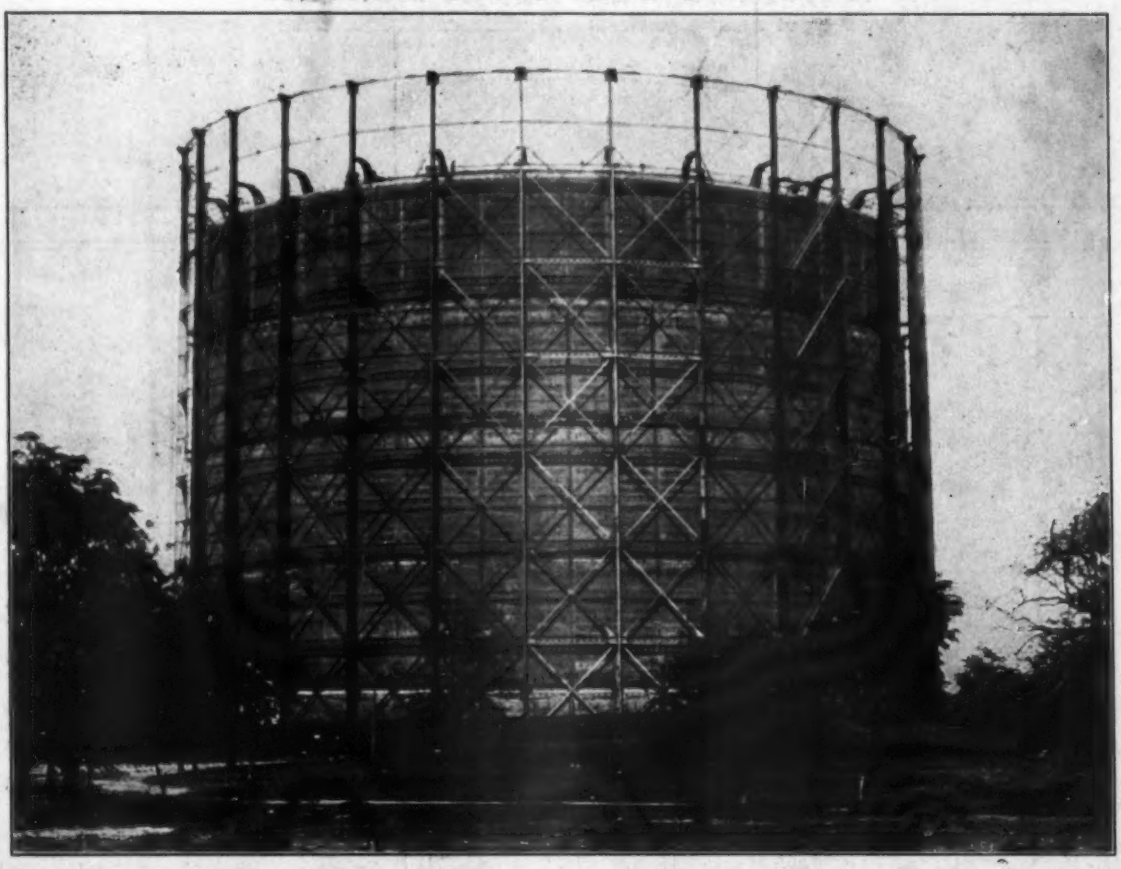

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Vol. CVIII, No. 24 NEW YORK, JUNE 15, 1918 Whole No. 3145

The Gas Appliance Testing Laboratory—Part VIII

Testing the Thermostat—Underlying Principles—Energy Sources the Deviser Has to Work On—Apparatus Used

By H. M. RILEY and L. B. WILSON, Jr.,

Consolidated Gas Electric Light & Power Company of Baltimore, Baltimore, Md.

The reader is no doubt aware of the fact that there are a number of automatic water heater thermostats and valve mechanisms on the market that operate in a satisfactory manner, all of which show that considerable thought and study have been devoted to this type of gas-consuming appliance. In other words, the early success of commercialized patents in this direction was in itself of sufficient impetus to cause minds of a mechanical turn to devise other and different means for producing the same results, and at the same time not infringe on the original patents. These efforts, the like of which make for a healthy stimulation and growth of any project whose nature is mechanical, have given to the gas business some truly ingenious devices, all producing the same results in relatively quite different manners.

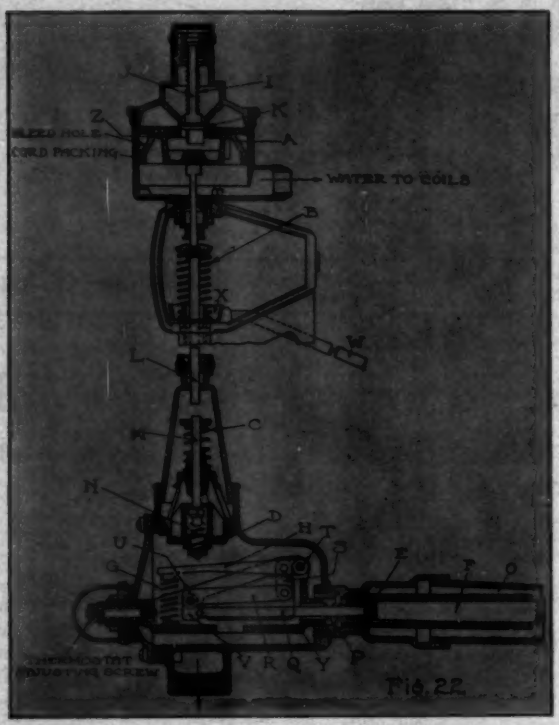
Incidentally, the writers have heard some comments to the effect that such and such a thermostat was almost a direct copy of another of a different make which has enjoyed considerable success, and therefore is something to be rather frowned upon. This attitude is entirely retrogressive, for, after all, a certain amount of the "imitate-the-copy" spirit coupled with inventive ingenuity is the history of all successful mechanical contrivances.

Nevertheless, the laboratory man should bear in mind that the satisfactory performance of a thermostat during long periods of time on the consumers' premises is in no wise measured by the "blue-print action" of the same, or even one or two successful trials while under test. In other words, he should not be misled by any and every new device of this character through the medium of a neatly executed drawing or the alluring mechanical appearance of the article itself.

With these brief considerations in mind, we should at once recognize the fact that the thermostat is of necessity rather complicated. We have only to consider what it is called upon to perform and the attendant conditions in order to realize that it cannot be an "open-and-shut" proposition as far as simplicity is concerned. For example, let us consider one very important factor which influences the design of a thermostat, namely, the rise in temperature of the water heated. This rise in temperature is employed in expanding some medium, usually a solid rod or a hollow cylinder of metal or other material, and since this rise in temperature of the water is rarely greater than 80 or 90 deg. Fahr., it is quite obvious that but little linear expansion can be looked for even when using a metal with a high coefficient of expansion. Hence, any such movement must be increased or multiplied by a lever or series of levers, and at once we have to deal with a somewhat complicated device. And so on in turn each movement to be accomplished and its corresponding return to normal position involves the use of springs, levers and what not in order that the desired object be attained. We have made these few preliminary remarks, as well as the following one, not with the idea of giving the laboratory man the impression that he is to expect a great mechanical conglomeration when he has at hand a thermostat, but rather that the same is not and cannot be ridiculously simple and therefore is worth some careful study and consideration on his part.

What Thermostat Is the Best?

The laboratory man might well raise the question as to which one of several first-class thermostats might be considered the best in the aggregate. We feel that this is a rather difficult query to answer directly, particularly when we have dispensed with any apparent mechanical advantages of one type over another. Of course, we know that as a general rough rule of two pieces of mechanism intended to perform the same function, that the one is superior which has the least number of parts. This premise naturally assumes that both operate more or less satisfactorily. But even here at the outstart we encounter perplexing problems. For instance, we would have no license to say offhand that one thermostat was better than another, because, in the first case, three springs were used in the makeup, whereas in the second four were employed, since there might be some other attendant factor that would offset any advantage along this line. And so the other individual parts might be compared and still lead to no conclusive decision. The writers therefore feel that, except



for a few known facts which will be presently discussed, the only way to compare the relative merits of two or more thermostats is to operate them many hundreds or thousands of times by means of some motor-driven mechanism until failure to act, or breaking down of some of the parts, or other defects assert themselves.

This is not felt to be absolutely necessary in the testing routine, and is merely mentioned in case one cares to resort to some such testing expedient. For, after all, if two thermostats were operated till failure occurred, and one was given a number of movements corresponding to thirty years' use in service and the other thirty-five years, we would have to search for the superiority of the one over the other along other lines, since in either case this amount of time would more than measure the average life of such a water heater; also it would be painfully apparent that some other part of the heater would have worn out ere any such time had elapsed.

Actuating Forces at Hand

It might be well at this point to enumerate the forces which the inventor or designer of a thermostat and valve mechanism for a water heater has at hand in order to actuate his device. By so doing it is hoped that the reader will have a fuller and more intelligent conception of the subject under discussion. Incidentally, these and some of the following comments and speculations are made with the idea of applying to the ordinary thermostat as used in conjunction with a circulating water heater as well as to the automatic water heater type. There are a number of forces which the designer has at his command for the work at hand, and some of these and their general characteristics are listed below:

1. Water pressure. This refers to the pressure of the water as it exists in the city mains, and is most always used in this particular instance in actuating or moving a water piston, which, in turn, either directly or indirectly, through the medium of a stem, rod or lever, opens the main gas supply valve, thereby permitting gas to flow to the burners. As a general rule, this movement is direct and not multiplied by any lever mechanism.

2. Energy of a helical spring. Here the energy in a coiled spring when under either tension or compression is employed in forcing some of the movable parts back to their normal positions. This usually takes place when the hot-water faucet is closed, and as a general proposition the energy of these springs is supplied when they are released from a state of compression. That is, it is seldom that tension is applied to a spring in an automatic water heater.

3. Energy of a flat ribbon spring. Here we have to do with the force gotten from a flat narrow strip of spring steel when the same is bent or flexed from its normally straight position. In this case, the spring is usually flexed in one direction only from the usual straight position, and it can be used for performing much the same function as in the case of helical spring. Incidentally, a coiled ribbon spring might also be used for the same purpose.

4. Electrical energy. In the case of some thermostats the energy represented in the force exerted by a piece of soft iron that has been previously magnetized is utilized in attracting another piece of iron or steel, overcoming some other counter force and actuating a lever for opening or closing a valve.

5. Force of gravity. Here, as might be supposed, the tendency of bodies heavier than air to fall towards the center of the earth finds employment in moving a lever or what not back to its normal position, after same has been moved away against the pull of gravity. Such a lever is always counter-weighted to assist or accelerate the pull of gravity.

6. Expansion or contraction of some material due to heat. All thermostats are dependent for their action on the energy produced when some material is expanded or contracted due to heat or cold. The materials most generally used are metal and some highly volatile liquid and gas in the order named. In this connection it is quite plain that such energy is in a sense a function of the lineal distance the material is expanded or contracted, and since such distance is relatively small, the movement is always multiplied by a system of levers.

Number of Forces Employed and Relative Merits

It is a peculiar coincidence that the one unfailing force which is quite frequently used in other pieces of mechanism is seldom ever employed in the makeup of the thermostat and valve mechanism of an automatic water heater. We refer to the force of gravity, and, incidentally, the writers have only had brought to their attention two devices in which such a force was utilized; also these were thermostats for use in conjunction with a tank water heater and not an automatic type, and, still further, were not a commercial success. The explanation for the lack of usage of this force is no doubt contained in the fact that in order to effectually seat a valve by the force of gravity, a rather long lever arm with a fairly heavy counter-weight thereon would have to be employed or, vice versa, a shorter lever

arm with a relatively much heavier counter-weight.

Magnetic force has been applied with some degree of success in certain makes of thermostats; that is, in those employed in conjunction with circulating gas water heaters, and, incidentally, we should not be too severe in our criticism of the same, since it is a fact that such energy finds an increasing as well as reliable usage in electrical and mechanical machinery of all types. Of course, there is a likelihood when such a force is employed, as in a magnetized piece of iron, that in some cases dirt, condensation, etc., might coat the metal to such an extent as to partially or wholly nullify the magnetic pull produced. It also goes without saying that severe shocks will greatly impair the magnetism of a piece of iron. After all, however, it is quite a simple matter to test any magnet, and by all means such should be done for a large percentage, if a company is considering handling a thermostat involving this principle.

A spring of some character is found in nearly every thermostat and valve mechanism, whether for use on an automatic gas water heater or a circulating heater type. As a general proposition, these springs have been given some care and thought in their design and subsequent manufacture, and are therefore rather trustworthy. Most generally they are made of some material which fairly well withstands the deleterious influence of water and any adverse constituents in the gas—condensation, sulphur, etc. A helical spring of round wire is probably more enduring than a flat ribbon spring, for the reason that the strain produced in the same is more often spread over a greater length for the former than for the latter. A spiral ribbon spring, however, has probably just as much stability and wearing qualities as a round wire helical spring. In the case of springs, we would also caution the laboratory man not to look with too much bias on their use in thermostats and valve mechanisms, since they find reliable usage in many other every-day articles of a like nature.

Naturally, some substance which expands and contracts, due to heat and cold, must be used in the makeup of a thermostat, and it will be pretty generally conceded that of the mediums that can be employed a metal of some kind is most preferable. However, certain highly volatile liquids, as well as some gases and air, have been employed as the matter to be acted upon by the heat, with signal success. When such substance is used, it must be hermetically sealed in a bellows or accordion-shaped chamber of quite thin metal, and at once two avenues for failure to act open up: First, liability of chamber not being effectually sealed, and second, chance for the thin wall being punctured or worn through by corrosion. However, let it be understood that the employment of the latter named materials does not, in our estimation, necessarily condemn the appliance or apparatus on which it is used.

It would now probably be in order to describe the action in detail of some types of thermostats, after which one will be chosen for explanation of a test to failure on the same.

Explanation of Fig. 22.

Upon opening a hot-water faucet, the water pressure on piston A becomes unbalanced, and being greater on the inlet side piston A is forced downward. At the same time spindle J, which is normally tending to move down, due to spring I, which is at the outstart in a state of compression, follows piston A for a short distance, or until the spring I has resumed its neutral or unstressed length. Then piston A, continuing to move downward, unseats small water valve K and the water runs through the opening formed and thence to the coils in the heater. Immediately, or shortly after, the further travel of piston A is stopped, due to the fact that the pressures on the top and bottom of the same are equal in their action. In the meantime, the downward travel of piston A has caused stem L, which is rigidly connected to the same, to put spring B into a state of further compression (spring B is nominally slightly compressed), and also to engage stem M, pushing it down. In turn, the down travel of stem M compresses spring C, which is normally slightly under compression, and also enables valve D to drop, thereby allowing gas to pass to the burners. Valve D is aided in its downward unseating motion by spring N, which is normally slightly under compression.

Now the heated water in its passage through the heater circulates around copper tube E in space O and naturally causes tube E to expand. This expansion leaves a clearance between the right hand end of porcelain rod F and tube E, and this is taken up by spring P, which is normally under compression, shoving rod F to the right. This state of affairs allows spring G, which is normally under compression, to push up on lever H, since spindle Q is also pushed to the right by heel V of lever R, which is connected to lever H by link S (points T and U are fixed). The upward travel of lever H forces valve D back to its seat, thereby shutting off the flow of gas. This seating of valve D again puts spring N into a state of compression.

Now, when the gas is shut off, the water cools off and copper tube E contracts, thereby pushing porcelain rod F against stem Q, causing same to move to the left and compressing spring P. At the same time stem Q pushes against heel V, causing lever R to rotate clockwise about point U. In turn, lever R pulls down on lever H through the medium of link S, causing lever H to rotate counter-clockwise about point T and away from valve D. This results in spring G being placed under compression and the compressive state of spring N pushes valve D from its seat and allows gas to again proceed to the burners.

When the hot-water faucet is closed, the water pressure on both sides of piston A becomes equal, and hence the energies of springs C and B under compression push up piston A until valve K seats, and continues to push up until spindle J attains its utmost upward travel and spring I is placed into a state of compression. When piston A engages stem J, causing valve K to seat, the water above piston A is displaced through a small bleed hole as the piston A continues to move up to its normal position.

The action of the thermostat adjusting screw is as follows: When it is turned in a right-hand direction, say, carriage Y, which holds levers H and R, moves to the right, and it is an easy matter to see that heel V will encounter stem Q, which is fixed, and therefore lever R will rotate about point U clockwise, moving lever H away from gas valve D. Hence the tendency is for the thermostat to shut off at a higher water temperature. Vice versa, a left-hand movement of the thermostat adjusting screw will cause lever H to draw closer to valve D, whereupon the thermostat will act at a lower water temperature.

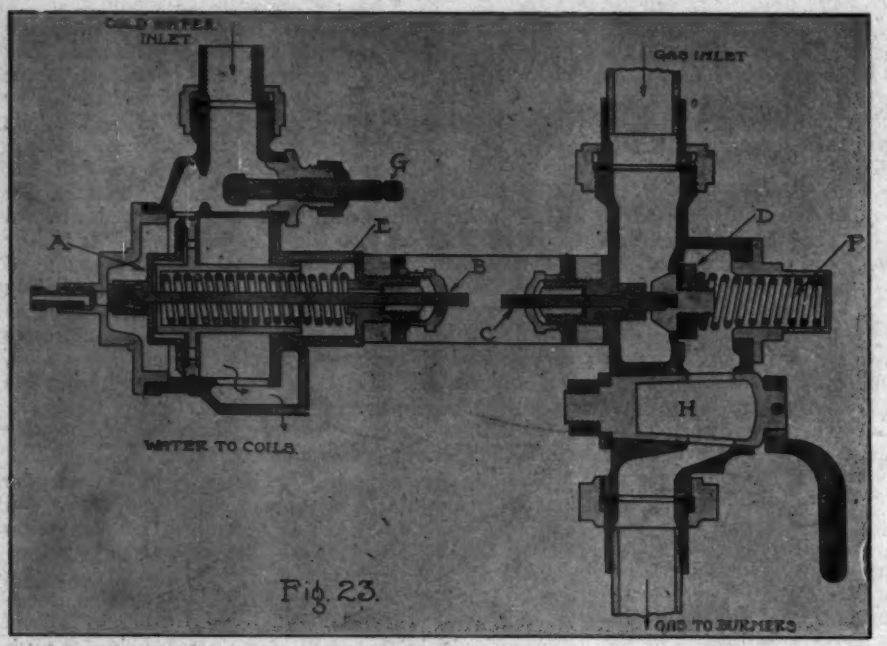


Fig. 23.

W is a spout or tube for conducting away any water that might drip into X from the valves above.

Explanation of Fig. 23

The cut shows the water gas valve of another type of automatic heater. It is of quite simple design, and does not include any thermostatic control feature. The cut shows the water and gas valves in their normal closed position. Upon the opening of any hot-water faucet upon the system the water pressure upon the two sides of the water plunger "A" is unbalanced and water pressure on head of the plunger being greater than the back water pressure, plus the force of the spring "E," the water plunger "A" is forced forward to the right against the spring "E."

During this motion the piston stem "B" of the water valve plunger meets the piston stem "C" of the gas valve, and forcing it to the right against the gas valve spring "F" unseats the gas valve plunger "D," allowing gas to pass to the main burners of the heater.

Closing the hot-water faucets of the system creates a condition of water pressure equilibrium on the two sides of the water valve plunger, which is returned to its normal position by the action of the spring "E," and the gas valve plunger is reseated by its spring "F," thus cutting off the gas supply to the main burners of the heater.

The balance of water pressure on the two sides of the water plunger is insured by the provision of a small water channel through the head of the plunger.

The amount of water passing through the heater may be regulated by varying the size of the water passage where it enters the valve. This is accomplished by means of the pin "G," which may be screwed in or out, as the case may require.

A shut-off gas cock "H" is provided. The gas on its travel to the main burners passes through this cock, which may be conveniently closed when lighting the pilot burner of the heater, or at other times. Under normal conditions of operation this cock is, of course, left open for the free passage of gas.

This valve is used by the manufacturer on certain types of heaters without any thermostatic control device, but on other types of heater is used in conjunction with a thermostatic control device which acts upon a gas valve which is entirely separate and distinct from the water gas valve shown in this cut.

Explanation of Fig. 24

This cut shows another type of water gas valve and thermostat mechanism employed upon a certain type of automatic water heater. The cut shows the valves in their normal position when the hot-water faucets of the system are closed.

Opening any faucet unbalances the water pressure on the two sides of the rubber diaphragm "A" and the brass plunger "M," thus causing it to move upward until the end of the rod "B" comes in contact with the end of the rod "D" of the thermostat. The plunger "M," continuing in its upward motion upon the stem "B" and against the spring "F," causes the water valve "E" to open, thus allowing the flow of water through the heater.

As the water valve piston is moved upward, this motion is transmitted to the gas valve "H" through the rods "C" and "G," and the gas valve plunger is lifted or pulled from its seat against the spring "N," thus allowing the gas to flow to the main burners.

The water, of course, passes from the water valve to and through the coils of the heater, where it is heated, and from thence through the thermostat to the hot-water faucet. Should the quantity of water drawn be at a rate considerably less than that of the capacity of the heater, then the combustion of the gas will quickly overheat the water, but the temperature of it is prevented from excessive rise as follows:

The overheating of the hot water, which, as has been said, flows through the thermostat, transmits its heat to a sensitive liquid contained in the brass bellows "L." This causes the liquid to expand. The upper end of the bellows being fixed, the lineal intention of it, caused by the expansion of its contents, is downward against the spring "O." The motion of the bellows is transmitted through rod "D," which, being in contact with the rod "B," transmits this motion in turn against the spring F to the rods "C" and "G," thus relieving the upward pull upon the gas valve plunger, and by so doing allowing the opening of the gas valve to be reduced to the point where the quantity of gas to the burners is only sufficient to heat the water to the predetermined temperature for which the thermostat is regulated by adjustment at "K."

A wider faucet opening will, of course, again allow a normal flow through the heater, which by a cooling effect upon the liquid contents of the bellows "L" will cause a contraction, thus allowing a reciprocal motion upward, actuated by the spring "O."

This motion will, of course, relieve the downward pressure upon the rods "D," thus allowing the spring "F" to return to rods "D" and "B" to their normal open position. The upward motion of the rod "B" is transmitted to the rod "G" through the rod "C," thus pulling the gas valve plunger up against the spring "N" and allowing the full flow of gas to the main gas burners.

The closing of all hot-water faucets produces a condition of water pressure equilibrium on the two sides of the water plunger "M," which is returned to its normal closed position by the spring "F." Then the rods "B" and "C" move downward, relieving the pull upon "G" and allowing the spring "N" to reseat the gas valve plunger "H" and close off the gas to the main burners of the heater.

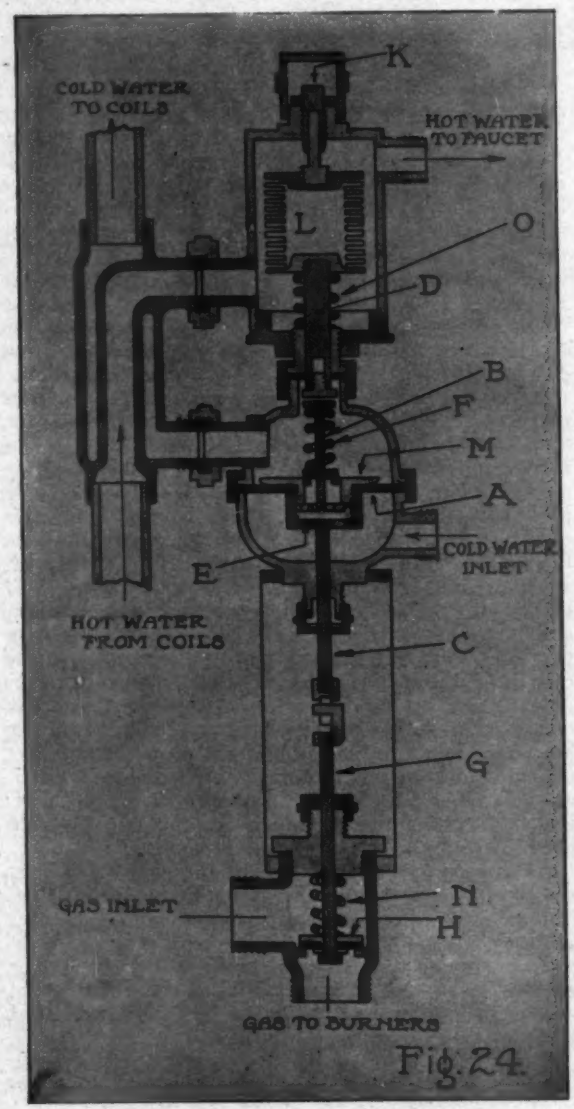


Fig. 24.

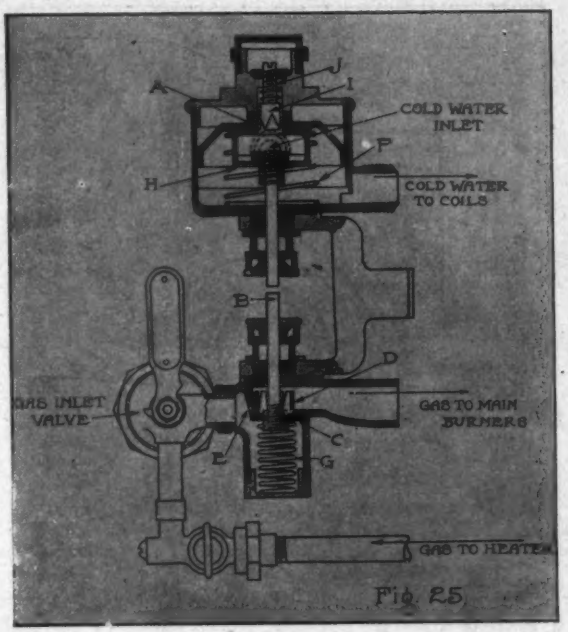


Fig. 25

EXPLANATION OF FIG. 25

The cut shows the water and gas valves of this mechanism in their normal position when the hot-water faucets of the system are closed, and therefore no water is passing through the heater.

Opening any hot-water faucet unbalances the water pressure on the two side of the water valve plunger "A," thus causing this plunger to move down, compressing the spring "F." This motion causes the stem of the water valve to come in contact with and exert pressure upon the stem of the gas valve plunger, thus unseating the gas valve plunger "C" against the spring "G" and allowing gas to pass to the main burners of the water heater.

In this particular form of water valve the water flows through the valve by passing through the center of the plunger head. In the normal position this opening is closed off by a small secondary plunger "I." This plunger "I" has a limited reciprocal motion, and as the piston "A" moves down the opening is kept closed through a part of its stroke by the plug or plunger "I," which is moved forward with the main plunger by the spring "J." This has the effect of maintaining the condition of unbalanced water equilibrium until a sufficient distance has been traveled by the water plunger "A" to unseat the gas plunger "C." In the return of the water valve plunger to its normal position, the plug "I" is again met, and gradually closing the opening through the center of the plunger "A" is forced back by spring "J."

As a part of the gas valve plunger, there is a cylindrical brass graduating valve "D." This cylindrical part of the plunger has a number of V-shaped slots in it through which the gas must pass on its way to the burners. The amount of gas of a given pressure passing through this type of valve will vary with area of the slotted openings, which in turn varies with the extent of the motion of the plunger below its seat "E." The extent of the motion of the gas valve plunger "C"

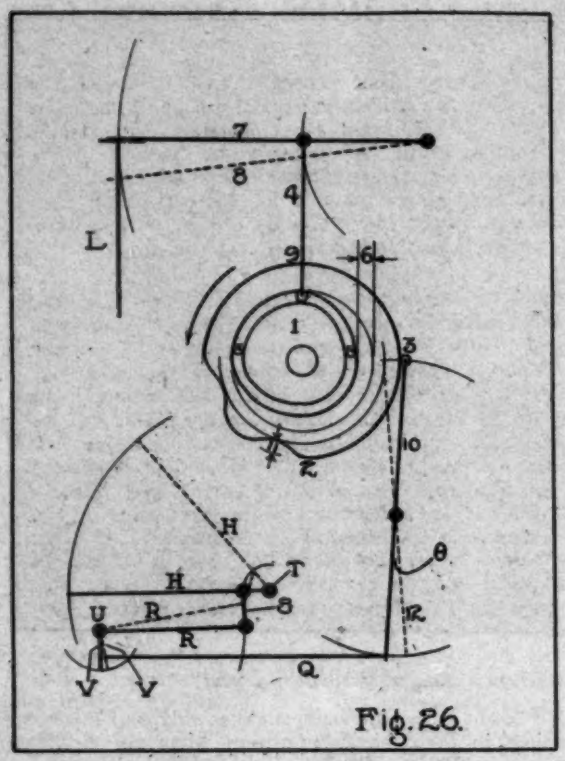


Fig. 26.

is directly controlled by movement of the water valve plunger "A," and as this motion varies with the amount of water drawn through the water valve the amount of gas to the main burners varies with the amount of water to be heated.

Reducing the flow of water at a faucet reduces the pressure differential on the two sides of the plunger "A," causing it and also the gas valve plunger "C" to move up, thus by reducing the area of the slotted gas ways reducing the amount of gas at the main burners. This device under favorable conditions tends to maintain a fairly uniform temperature of hot water and prevents it from becoming overheated. No thermostatically controlled gas valve is provided with this type of mechanism.

When the water faucet is shut off the water pressure on both sides of the water valve plunger "A" being balanced, this plunger is forced up by "F," thus relieving the pressure against the gas valve stem "B," and the gas valve plunger is in turn forced up and reseated by action of the spring "G," thus cutting off the gas supply to the main burners.

There is a special safety device incorporated in this water valve. It consists of a pair of thin flexible metal discs "H," which, as the water flows through the valve, are bent down at their outer edges into the form of a truncated cone, thus allowing the flow of water in this direction. If, however, the water valve bends and does not move up upon the closing of the hot-water faucet, the steam formed in the coils acts up against the discs "H," forcing them back against the water ways through the plunger "A," and by preventing escape of the steam employs it as a force to move the plunger "A" to its normal position, thus allowing the spring "G" to reseat the gas valve plunger and close off the gas to the burners of the heater.

An important feature to be noted in this connection is that if for any reason the gas valve plunger itself sticks, and the valve be held open after the closing off of the hot-water faucet, then the steam formed in the coils is prevented by the discs "H" from escaping, as it otherwise would, back through the cold-water supply pipe, and, in the opinion of the writers, the safety device thus creates a condition of danger of explosion.

Testing Mechanism Mechanically

We have illustrated graphically by means of Fig. 26 an apparatus which could be fairly inexpensively constructed for use in conducting a test to failure on the thermostat and valve mechanism of an automatic water heater. For the sake of being specific, the apparatus is described for use in conjunction with the mechanism shown in Fig. 22. It would be well for the reader to bear in mind that each style of water heater would probably require a different style of apparatus to conduct the test under consideration.

The number 1 depicts a double cam which is turned at the rate of about 400 r.p.m. by being properly geared or belted to an electric motor. Also a recording revolution counter is provided. Now as cam 1 turns a quarter of a revolution, or when point 2 moves to the position occupied by point 3, link 4 is constrained to move down by means of eccentric slot 5, and the total downward movement of link 4 is measured by the distance 6, which the slot draws closer to the center of the cam. This downward movement of link 4 pulls lever 7 into the position 8, pushing down on spindle L (also see Fig. 22), and putting the affected parts of the mechanism (water heater) in the same condition as if water were passing through the heater. As the cam continues to revolve, and point 2 moves to position 9 (one-quarter revolution additional), lever 10 moves to position 12, then back to position 10 twice. The angular distance is, of course, governed by depression 11 in the cam. In the meantime, the position of link 4 and lever 7 (in position 8) is not changed, since the slot 5 for this quadrant of the cam is at all times equidistant from the center. Now, when lever 10 moves to position 12, spindle Q moves to the right, heel V to V', R to R', H to H', etc. In other words, we have the same effect as if the thermostat were acting due to the water temperature rising and falling. During the turning of the cam through the third quadrant, link 4 gradually moves upward and the lever 7 resumes its normal position, creating a condition corresponding to the closing of the hot-water faucet. This is brought about by the fact that the radius of slot 5 gradually increases to its maximum length. Also lever 12 resumes its normal position, and during the revolution for the last quadrant no movement of the parts takes place.

After each 5,000 revolutions of the cam the springs can be removed from the thermostat and valve mechanism and stressed or flexed, as the case may be, in order to detect any falling off in the force necessary to compress or stretch the particular spring to its shortest or greatest length, as governed by its movement in actual working conditions. This might be better explained as follows:

Take the case of spring B (Fig. 22), and assume that its normal compressed length is 2 in., and also when

removed 4 lb. is necessary to keep the length at 2 in. Now say at the end of 10,000 movements only 3.8 lb. are necessary to keep the length at 2 in., whereupon it is apparent that spring B has deteriorated and will not exert as much pushing force as originally. We can also imagine a very large number of movements that would render the spring almost permanently set, so that when removed, no force would be required to compress its length to 2 in. Other tests along this line can be run, and a short perusal of the subject of springs in any standard book on mechanics will suggest ideas for carrying out such tests.

At the end of each interval the mechanism can be replaced on the heater and operated under actual conditions, and any failure to act properly or complete breaking down can be noted.

In the case of spring B, a failure to properly function would assert itself in a leakage of water past the valve with the attendant burning of gas.

Not taking into account any visible or otherwise apparent defects, it is our opinion that thermostats and other similar mechanisms will be tested along the rigorous lines suggested above by all laboratories in the near future.

How the Gas Companies Are Helping the Nation

JOSEPH MCCUE, a former office employee of the Charlestown Gas & Electric Company, Charlestown, Mass., and now a private in the Quartermaster's Corps, recently enjoyed a brief furlough at home.

THE CANTON GAS & ELECTRIC COMPANY employees, of Canton, Ill., have contributed to the Red Cross war fund, giving the firm 100 per cent rank. All their subscriptions were for $4 each, except two, one for $5 and one for $8.

G. E. STELLER, who has been connected with the engineering department of the Southern Counties Gas Company, Los Angeles, Cal., on June 7 left for the Enlisted Specialists' Preparatory School of the Coast Artillery, Fort Winfield Scott, San Francisco, Cal., which will ultimately lead to a commission. During his absence H. L. Jackson will assume his duties.

F. A. C. TOCQUE, formerly connected with the sales department of the Louisville Gas & Electric Company and the Fort Smith Light & Traction Company, is now with the 2nd Battalion, Artist Rifles, Hare Hall Camp, Romford, Essex, C Company, Officers' Training Corps, England. In a letter to the JOURNAL, dated May 24, Mr. Tocque writes: "I arrived here a month ago, and am now attached to the above Officers' Training Corps. I have been accepted for the Royal Engineers, and hope, in due course of time, to secure my commission. I enlisted in Chicago from Louisville, went from there to Windsor, Nova Scotia, and crossed with a convoy. I shall be appointed to the electrical side of the engineers, as my experience is with both gas and electricity. I am stationed at a splendid camp. Everything is all one could wish for. The work and training is hard, but interesting."

THE CLINTON GAS LIGHT COMPANY, of Clinton, Mass., recently established a bureau in its offices which is known as the Food Facts Bureau. Considerable literature regarding food conservation has been distributed to those who are interested enough to visit the bureau and inquire, and a number of people have brought in recipes which they have tried out and found satisfactory in making more economic dishes.

THE CONSOLIDATED GAS COMPANY OF NEW YORK and its affiliated gas companies have a splendid subscription record to the Third Liberty Loan Bonds, 95 per cent of the total number of employees having subscribed. In the case of the Central Union Gas Company, the New York Mutual Gas Light Company and the National Coke & Coal Company *every* employee subscribed. A 100 per cent record. More than 99 per cent of the 755 employees of the Astoria Light, Heat & Power Company subscribed to the third issue of Liberty Bonds, 96 per cent of the Northern Union Gas Company's, 95 per cent of the New York & Queens Gas Company's, and 93 per cent of the New Amsterdam Gas Company's. Ninety-two per cent of the Consolidated Gas Company's employees and an equal percentage of the East River Gas Company's employees purchased the bonds of the Third Liberty Loan.

THE WELSBACH COMPANY, of Gloucester, N. J., succeeded in collecting $32,000 for the Red Cross drive, which is an excellent showing when you consider that $12,000 was the quota for Gloucester City. The amount received from the Welsbach Company employees alone averaged $3.25 per person. Townsend Stites, general manager of the company, captained the team.

There was considerable rivalry between the Welsbach team and the Victor Talking Machine Company team, both in this drive and in the first Red Cross drive. The Victor team managed to collect $22,000 as against the Welsbach team's $32,000. In the first Red Cross drive the Welsbach team collected $22,500.

A dance was held in the evening on the roof of the

PROCEEDS OF DANCE HELD AT NIGHT ON FACTORY ROOF DONATED TO RED CROSS

FLOAT MADE BY WELSBACH COMPANY AND DONATED BY IT FOR GLOUCESTER RED CROSS PARADE

Welsbach factory, the proceeds of which were donated to the Red Cross. Upwards of 1,500 people attended this dance. Admission fee was charged and refreshments sold, and upwards of $1,000 was collected for the fund. Earlier in the evening a parade of Red Cross floats was held. The floats were made and donated by the Welsbach Company.

JOHN J. O'CONNELL, formerly manager of the Amherst Gas Company, Amherst, Mass., left May 31 for Fort Slocum.

DWIGHT W. JONES, who was formerly assistant superintendent of the Potrero Gas Works of the Pacific Gas & Electric Company, of San Francisco, Cal., and whose enlistment as private in the 144th Field Artillery, known as the "Grizzlies," was mentioned in the Sept. 8, 1917, issue of the AMERICAN GAS ENGINEERING JOURNAL, has recently received a commission as second lieutenant. Lieutenant Jones enlisted in August, 1917, and within three months was promoted to corporal and afterwards to sergeant. While at Camp Kearny with his regiment he passed the examinations for Third Officers' Training School, and recently graduated near the head of his class in Field Artillery. He has now received his lieutenant's commission and has been assigned to Company C, 115th Ammunition Train at Camp Kearny, Cal.

THE UNION GAS & ELECTRIC COMPANY employees held a unique rally in Cincinnati, Ohio, Saturday, May 25, for the benefit of the Red Cross. The affair was in charge of N. A. Sloan, superintendent of the Foundation Company, which is erecting the new generating plant. Colored banjoists played and sang old plantation songs and patriotic airs. The quartet of "job talent" that sang was something out of the ordinary. Lemonade and sandwiches were served. Speeches were made by Judge R. Z. Buchwalter and Attorneys E. T. Dixon and James G. Stewart. Newell Hargrave, of the Red Cross committee, was present with a corps of young lady solicitors for the Red Cross to take a last contribution. The men of the Foundation Company on the new gas plant were already 100 per cent for the Red Cross, but went over the top again. The rally was held at the plant.

FREDERICK WYLLIS CALDWELL, of Kingston, has received a commission as second lieutenant in the Aviation Section, Signal Reserve. Lieutenant Caldwell, who attended the Woonsocket High School and pursued a course at the Rhode Island State College, was employed as cashier for the Taunton Gas Company at Taunton, Mass., at the time of his enlistment in the Aviation Section, Signal Reserve. He was assigned to the Massachusetts Institute of Technology last September, where

(*Continued on page* 574)

Putting It Up to the Public

People Are Forgetful and Frequently Have to Be Reminded of the Facts, Yet There Is No Limit to the Possibilities That Lie in Providing Them An Increased Knowledge of What Is Taking Place in An Industry That Vitally Effects Them

By RALPH ELSMAN
General Manager, Kings County Lighting Company

More and more are public utilities coming to realize that publicity of the educative kind is of inestimable value in solving the problems of rendering efficient service. The consensus of opinion seems to be that the public is entitled to an increased knowledge of what is taking place in industries that so vitally effect them.

Fear of a rule without reason seems to have caused a hesitancy on the part of many to adopt a policy which undoubtedly is radical to those of a conservative turn of mind.

Mob rule has always been a subject which has been looked upon with apprehension, although all of us have always professed the greatest respect for public opinion and its power. It has been my experience that public opinion is based on a tolerant judgment of the average citizen, and the only reason that it sometimes is harsh is because all of the facts are not always known.

A very concrete example of the lengths to which we can go was given last winter during the coal shortage and the severe coal snap. It was natural that people facing a coal shortage should turn to gas as the one means available for heating, with the result that practically every plant in the East was taxed to its utmost. When the situation became alarming, and there seemed to be no relief in sight, we placed the matter squarely before the public. The consumers were reached at their homes by the telephone. They were called upon by representatives of the company and a courteous explanation was made together with a request that conservation be practiced insofar as it was possible. The results were immediate and proved that putting it up to the public was a pretty safe policy to follow, particularly where a reasonable explanation was made.

During these strenuous war-times, when every citizen of the United States is bending his efforts toward a successful prosecution of the world conflict, all businesses are facing the problem of maintaining efficiency under trying circumstances. In the public utilities field our problems are many, and to keep ourselves afloat with ever-increasing costs haunting us is a man-sized job.

We have gone to the public with our story and told it as simply and as forcibly as we knew how. We have explained why prompt payment of bills is a great help, why conservation at times is urged, why we are asking the public for full co-operation in order that we might maintain ourselves as economically as possible. The result of our campaign of education, for that is what we call it, has been to win over to a fair judgment the population which we serve. We started our drive with the hope that we might have fair support, but we found, to our amazement, that we not only had fair support, but that we had real co-operation from the public. When first we contemplated our campaign of publicity, we somewhat feared the outcome. Now we know that while the public is forgetful and constantly must be reminded of the facts, nevertheless there is no limit to the lengths to which we can go in building for the future.

We know that "after the war conditions" are going to be a whole lot different from "pre-war conditions," and we know that the time to start our cultivation work is now.

RALPH ELSMAN

When it comes to putting over a campaign such as this of which I write, every employee, of no matter what department, must be enthused with the thought that the story which we have to tell is one in which he plays an active part. If the benefits had been no greater than the mere welding closer together of our organization, it would have been truly worth while, for this was one of the first benefits we derived. But that was not the only gain, for we now have in place of a semi-interested public a loyal citizenry which knows the efforts we make for its comfort.

The Machine That Has Become Too Small

Somewhere there is a gas company that has encountered a demand that is beyond what was normally to be expected. It has on hand, standing idle, generating equipment and other machinery that has many years of usefulness still in it. Its only defect is that it has become inadequate—too small in its present locality. Elsewhere there is a company that, starting smaller, has grown to the point where that idle equipment would amply fill the bill, and where it would serve as well as brand-new apparatus; in that, the years of useful life it is still good for are probably in excess of the period until the smaller company will have grown to such an extent that the equipment will again be relegated to idleness, not because it has worn out, but because it has a second time become too small to meet the demand.

At the present time we are in a period when nothing

new should be made unless there is nothing that will serve just as well standing somewhere idle. How many substitutions for new material that can be made in the gas field would be beyond the power of anyone to imagine. The field we are accustomed to regard as small in the sense that it is compact. We know that approximately $30 spent in postage will bring an inquiry to the attention of practically every plant in the country. Yet the field is not so small that there cannot lie buried within it considerable idle equipment and apparatus that someone else could use. It is the duty of those possessing such equipment and apparatus to reveal it to those others who might put it to moving again, not merely as a matter of turning inactive machinery into active dollars, but as an act of public service.

It is for the purpose of finding machinery that has outlived its usefulness in the place it was installed, but not its useful life, and placing it in a locality where it will serve just as well as a new machine would, that the Machinery Utilities Company, of 501 Fifth Avenue, New York City, has been formed. In scope it reaches out into all lines of industry. J. Alex. Mayers has been engaged to handle that part of its work that relates to the gas field. Gas men will do him a service by bringing to his attention whatever equipment they have to dispose of, or by inquiring of him as to whether he has in sight any equipment of which they may be in need.

Installation of 16 Meters Made At New Jersey Ship Yard

The Public Service Gas Company of New Jersey recently made an installation consisting of sixteen 150A meters, which are required to deliver the maximum demand of 40,000 cu. ft. of gas per hour, at the plant of the New Jersey Shipbuilding Company, Gloucester, N. J., which is described by Harry Ellis, engineer of distribution, Camden, in a recent issue of *Service*. These meters are supplied by an 8-in. intermediate pressure main, operating under pressures varying between 2 and 5 lb. The pressures are reduced to 3 in. (water column) by a 4-in. Lloyd regulating valve.

Instead of using tee fittings, 3-in. risers were welded to the 6-in. service and 6-in. outlet mains, to constitute the service and riser manifolds; 2½-in. couplings were also welded on the 3-in. risers, near their base, for making connections with the lower tier of meters. Ells (2½ in.) were employed between the 3-in. risers and the respective meters to secure the necessary flexibility of the connections and obtain proper alignment of the meters. Each meter is provided with a cock on the outlet as well as on the inlet, to facilitate exchanging a meter without interruption to the service. The inlet and outlet connection of each meter is also provided with a pet cock to facilitate testing the meters for registration and localizing fluctuations of pressures due to dirty valves. From the meter room the gas is conducted into an adjoining room, where the pressure is increased to 12 or 15 lb. by means of a motor-driven Nash compressor. To prevent back pressure upon the meters, a liquid seal self-recovering blow-off was installed between the meters and compressor. The gas is then delivered to the angle and plate bending shop and boiler and machine shop, where it is consumed by appliances installed by the Surface Combustion Company. These appliances differ fundamentally from the well-known air blast appliances, in that the gas is delivered to the mixer under blast pressure (1½ to 3 lb.), thereby entraining the air necessary for combustion, instead of the air being delivered to the mixer under blast pressure and mixed with gas under pressure commonly furnished by gas companies.

The angle bending shop contains a "⌂" shape oven furnace, 8 ft. wide and 25 ft. long, provided with a door at each end. Opposite each door is a bending table, upon which plates, channels and angles are bent into the various shapes required for hull construction, after they have been heated in the aforesaid oven, which consumes 16,000 cu. ft. of gas per hour.

The same building contains a smaller furnace, which consumes 800 cu. ft. of gas per hour for heating iron, preparatory to forging.

The machine and boiler shop contains a "⌂" shape oven furnace, provided with a bending table at one end. This furnace consumes 14,000 cu. ft. of gas per hour, and is used for heating plates and various shapes for bending and forging. This building also contains rivet heaters and four smaller furnaces for treating iron preparatory to forging.

Immediately adjacent to the yard of the New Jersey Shipbuilding Company is that of the Pennsylvania Shipbuilding Company. Both yards are approximately the same size and are under the same management.

The latter is using oil whereas the former yard will use gas for the same purposes.

Future conditions, numerous and ever changing in war-times, will determine which fuel will finally be selected for these yards to perform a part in bridging the Atlantic with ships.

Publications

Bulletin of the Bureau of Standards

No. 1 of Vol. 14. Flexible board backs; 10 x 7 in.; 166 pages; illustrated. Obtainable free from the U. S. Bureau of Standards, Washington, D. C.

The contents include: Determination of Degree of Uniformity of Bars for Magnetic Standards, by Raymond L. Sanford; Thermoelectric Measurement of Critical Ranges of Pure Iron, by George K. Burgess and H. Scott; A Study of Electromagnet Moving Coil Galvanometers for Use in Alternating Current Measurements, by Ernest Weibel; Standard Substances for the Calibration of Viscometers, by Eugene C. Bingham and Richard F. Jackson; An "Average Eye" for Heterochromatic Photometry, and a Comparison of a Flicker and an Equality-of-Brightness Photometer, by E. C. Crittenden and F. K. Richtmyer; Emissivity of Straight and Helical Filaments of Tungsten, by W. W. Coblentz; An Aneroid Calorimeter for Specific and Latent Heats, by Nathan S. Osborne; Wave Lengths of the Stronger Lines in the Helium Spectrum, by Paul W. Merrill.

Safeguarding the Home Against Fire

A fire-prevention manual for the school children of America, prepared for the U. S. Bureau of Education by the National Board of Fire Underwriters. Flexible board backs; 8 x 5¼ in.; 91 pages; illustrated.

A series of twenty-eight lessons, one of which is devoted to gas.

NOVEL DISPLAY OF GAS RANGES

A Stove In A Frame

A striking and catchy way of calling the attention of passers-by to their stoves, and at the same time an excellent way of utilizing the value of their large glass entrance doors, was adopted recently by Bare Brothers, of San Francisco. The store had an entrance with double doors, and about 6 ft. back of the doors was placed a large box lined with pleated and fluted black cloth. Within this box was placed one of the new nickel-plated gas ranges, and lights strung at the top and bottom of the box—but concealed from view of those outside—threw their white rays on the shining new stove. The box was encased in a large gilded frame, giving it the appearance from a distance of a picture in a frame. A large card beside it advised:

NOT "AN OLD MASTER"

but

A Masterpiece of Cooking Efficiency

THE BLANK GAS RANGE

Gas Sales Association of New England Holds Annual Meeting in Boston

George S. Barrows Speaks On House Heating by Gas—William Gould Re-elected Governor of the Association for the Ensuing Year

The Gas Sales Association of New England held its annual meeting at the Boston City Club on May 10, 1918. There was a large attendance and after dinner the election of a governor for the coming year took place. Mr. William Gould was re-elected to hold his position for the coming year.

The treasurer's report was read and approved. Mr. Gould in going over the past year's work felt that the success of the association, if there was any, depended upon the constructive co-operation of ideas between the gas company men and the gas appliance manufacturers, and felt the association in the coming year ought to add to its members a representative of every gas company and gas appliance manufacturer in New England.

The association has also co-operated in the past year with the New England Section of the N. C. G. A. and with the Commercial Managers' Association of New England, and there is no reason but what the coming year will be a most successful one.

At the conclusion of this very excellent paper, Mr. Gould appointed a committee to take up the question of formulating some sales plans for house heating by gas, and the first meeting of this committee was held at Providence, May 28, 1918.

George S. Barrows, manager of the gas heating department of the General Fire Extinguisher Company, of Providence, R. I., gave the following very interesting and instructive talk on house heating by gas. Afterwards many questions were asked and discussions followed.

(*Continued on page* 580)

Lincoln Company to Supply Light for New Training School of National Army

Arrangements have been completed with the Lincoln (Neb.) Gas Company whereby it will provide light and power for the vocational training school of the National Army which will open at the Nebraska Military Academy June 15, it was recently announced by Chancellor W. G. Hastings, of the State University. The contract has not yet been signed by the regents, but approval by the chancellor is regarded as practically final.

Appliance Men Visiting Clinton Homes to Prepare and Adjust Gas Consuming Devices

William E. Gould, commercial manager of the Clinton (Mass.) Gas Light Company, and four assistants are making a tour of inspection of the various houses which are lighted or heated by gas. A special crew of experienced gas appliance men are visiting the homes of gas consumers and are adjusting and repairing all gas consuming devices free of charge.

THE PRAIRIE OIL & GAS COMPANY has paid $300,000 bonus for a renewal of its lease on the allotment of Sarah Rector, a Creek freedman, in the Cushing field. This is the largest bonus ever paid for an oil and gas lease in Oklahoma.

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Provide for the Future

Few gas companies at the end of the next year will be operating under the same rates that they were two years ago. Increased rates in general are in order and very much needed.

At the best, much time, effort and expense will have been gone to in obtaining the increases. Rate raises do not come easy, even though they be obviously just.

Since we must go to this degree of trouble, it seems to the AMERICAN GAS ENGINEERING JOURNAL that in general it would be wise to go to a little additional trouble and remedy an obvious incongruity that has existed in the field almost from the beginning.

The salaried personnel of the gas field has been and is underpaid, as compared to similar workers in other industries. The absurdity of the situation lies in the fact that, through underpaying these workers, the gas industry profited nothing. Its rates in theory are based on its expenses, its investment and a reasonable return. If the workers had been higher paid, the rates would be proportionately higher to meet the additional costs.

In the past the salaried worker has not been especially aggressive in pressing his right to an adequate return on his efforts. In the future the case will be different. We may hotly argue against such an attitude on the part of the salaried worker, but we cannot change facts. The trend is towards a greater return on human labor. We must take that trend into earnest consideration and make provisions to meet it.

Dividends on Goodwill

The heat of the summer is near at hand. Our minds naturally confine themselves to matters of the present and forget experiences that are past. We are apt even to forget the suffering last winter from lack of adequate house heating and the possibility that similar conditions will ensue this coming winter.

We know of several companies which reaped a high value in good will, and at the same time took upon themselves the stress of several days of acute anxiety, because they were ready to step into the breach and help out. We do not think any of these companies even now begrudge the extra labors they went to, or the periods of anxiety they went through. They are proud of the fact that they helped to sustain the civilian morale in that part of the country they worked in. They realize that each share of their stocks has a higher real basic value because of the good will they gained thereby.

These companies would have been impotent to serve as they did had they not had the means at hand of rendering that service. Their ability to supply gas would have aided them but little had they not had in stock the appliances that would utilize that gas efficiently to heat houses.

On the other side of the shield we have a company in

mind that did not think it had the gas, and consequently stopped the sale of heaters. The consumer came to at least one of its local offices, as a matter of course, to buy gas heaters. His request was denied. As he passed out the front door, his eyes could not fail to fall full on the display window of a dealer directly opposite wherein were prominently displayed gas heaters of all shapes and sizes.

Various were the by-products of this glaring stupidity on the gas company's part.

In the first place, its action in stopping the sale of gas heaters did not diminish in one iota the use of gas for house heating in that locality. It could not. The gas heater is not a rare thing, nor can its issue or sale be controlled by any gas company in any locality. In this particular locality there was a gas heater in dealers' stocks for every one who wished to buy one.

A second by-product was loss of prestige on the gas company's part. Nine out of ten of the prospective purchasers went out of its offices under the impression that it did not sell him a heater because it did not have one to sell. In his eyes, the dealer across the way was a more influential purchaser and a more far-sighted business man than the gas company. In consequence, as a vender of gas appliances, the gas company in this community, in the gas consumers' eyes, looked like pretty small potatoes when contrasted to this dealer as a headquarters for gas appliances.

A third by-product was suspicion. Some disappointed purchasers went away with the impression that there was a crooked combination between the gas company's local personnel and the dealer to throw business over to the latter.

We are not compelled to sell gas appliances whether we want to or not. And we may realize that selling gas appliances means additional demands at times when we want rather to diminish them. But unless we can stop altogether the sale of such appliances in our territories, we had better not stop selling ourselves. We do not accomplish the end desired thereby, and we most assuredly render ourselves liable to some very lamentable consequences.

We likewise deprive ourselves of a source of profit that, pending the time when rates will be justly increased, may go some ways towards reducing the loss we sustain in the sale of our primary product.

Whether or not we think the burden of heating homes where the coal supply falls short should be placed upon us, it will be. We can stubbornly refuse to assume it, but if we do, our refusal will not free us of it, and it will entail some very disagreeable results.

We should have the heaters at hand to supply all who come to us to buy them. We are public servants, and the public has a right to demand that we serve it.

Where the gas is to come from is another question. As one step towards finding it, the AMERICAN GAS ENGINEERING JOURNAL suggests that the various companies try to locate those desperate individuals who commandeered the gas-cooking range as a heater last winter, and make sure that they, at least, are provided with sufficient heaters.

The Gas Furnace in Relation to Speed in Shipbuilding

We in the gas field are proud of the work the country's shipbuilders are doing, but we regard it as a little remote to our own direct interests, even though we know there are numerous and extensive gas installations in the shipyards. The AMERICAN GAS ENGINEERING JOURNAL has had this feeling, too. It has been receiving the Emergency Fleet Corporation's *Emergency Fleet News* for some time, and frequently wondered if, in the interests of conservation, we should not suggest they cease sending it—their job seeming so far apart from ours. In the June 3 number, however, we found that we are more closely linked up than we thought.

The Baltimore Dry Dock & Shipbuilding Company has set out to beat the "Tuckahoe" record. The company is headed by Holden A. Evans, a former U. S. Navy man, who has made a splendid record in rehabilitating it.

We have learned that progress on shipbuilding is regulated by speed in rivet driving. In other words, the riveting determines whether the program is to fall behind or be exceeded.

Mr. Evans has ideas of his own in regard to riveting; he contends that its chief limitation is heating—that a crack riveter can drive more rivets than a coke-fired furnace can supply him. "The gas furnace," the article in the *News* states, "has no limitations in heating, and with gas-firing, it is said, rivets cannot be burnt."

Two years ago we would proudly have held this forth to the industrial gas man as a big "boost" to help him to dispose of his gas-fired rivet heaters. Under the present circumstances, we are more inclined to accept it in the nature of a rebuke, even though it was not so intended.

There are undoubtedly a whole lot of factors that are going to win the war. But all of them are dependent upon the success of the shipbuilding program. If there is anything anyone of us can do to help it along, whether we are specifically asked to or not, it is very much up to us to do that thing.

If Mr. Evans is correct in his statement in regard to the relation of the gas furnace to increased rivet driving, and it isn't likely that he is not, then, the question arises, why are there *any* coke-fired furnaces being used.

We cannot "pass the buck" to the shipbuilders. The responsibility is ours. It is to be assumed that the gas man knows more about his product—gas—than the shipbuilder does. It is to be assumed that he has known for

a considerable time what Mr. Evans—a shipbuilder—has expressed. Why, then, hasn't he educated other shipbuilders to the same fact and filled their plants with gas-fired rivet heating furnaces? Wouldn't that have been helping the shipbuilding program along?

Selling Some Consumers at Price Lower Than Cost of Service

There are some who have advocated in the gas field, in the case of big bulk business, the adoption of a method of charging at one time used by the railroads and later by some electric companies, namely, that of charging a rate that will get the business regardless of whether there is a profit or a loss represented in the price charged, the great thing being to fill in the load curve valleys.

The AMERICAN GAS ENGINEERING JOURNAL does not believe any such development will occur in the gas industry. The tendency is away from any feature of business that does not pay its own way, even in the case of the gas appliance commercial departments. It believes it is a good thing, aside from the purely business aspect, that no such development will occur. There is a deep-seated aversion on the part of every human being to pay a part of the other fellow's bill. However we may coat it about with gems of the purest logic, we could never hope to convince the householder consumer of the justice or profit to him of compelling him to make up the whole profit or loss on the industrial consumer.

The JOURNAL does not take the absurd stand that the flat rate is the thing. Undoubtedly it costs less per unit of measurement to supply the large consumer than it does the small. He should accordingly be charged less per thousand cubic feet of gas, or per heat unit furnished, as the case may be. But his billing should represent the same ratio of profit. He should pay us as much for his gas as it costs us to serve him, and the same proportion of profit as the very smallest consumer.

Negro Women Now At Work At Atlanta Plant

Negro women have taken the place of men laborers to a large extent at the Thurmond Street plant of the Atlanta Gas Light Company, Atlanta, Ga., and are said to be giving thoroughly satisfactory service. Twenty are now employed, and the company intends hiring more.

The women do all the rough work formerly done by men, and stand up under it well. They wear men's overalls and rubber boots, and the average visitor would not know they were women by a casual glance.

The gas company was not the first industry in Atlanta to use women in men's work, however. The big fertilizer factories near Atlanta have employed them for some time with excellent results.

How the Gas Companies Are Helping the Nation

(*Continued from page* 568)

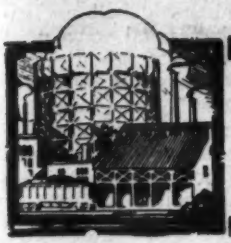
he trained for six weeks, and was then sent to Garden City, L. I., from the latter place going to Love Field, Dallas, Texas. He is now stationed at Hampton Roads, Va.

THE GREENFIELD GAS LIGHT COMPANY, of Greenfield, Mass., recently placed its offices at the disposal of the Greenfield Mothers' Club, where a very successful food demonstration was held. Permission to use gas stoves and dishes was also given free by the gas company. The demonstration was in charge of Miss Margaret Howard, of the Farm Bureau, assisted by Miss Bernice Merrill, instructor in domestic science at the high school. Among the things cooked and eaten during the demonstration were potato-cornmeal muffins, barley muffins, barley pie crust, wheatless shortcakes and rice muffins. All the products were pronounced delicious in spite of their wheatless character.

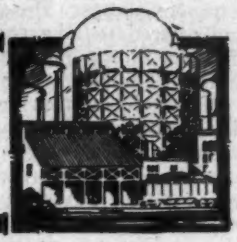
THE GLOUCESTER GAS LIGHT COMPANY, Gloucester, Mass., has two interesting window displays that are attracting much attention. One is an exhibit of pictures and souvenirs brought home by Sumner MacDonald. They include a vase made from the shell of one of the famous French 75s, a paper cutter made from used shells, a piece of a German aeroplane shot down on the battlefield of Picardy and parts of a German machine shot down in the Toul sector. The latter were sent home by Harold Armstrong. There is also one of the famous French war crosses on exhibition. In the other window is a display of flags with two stacks of old-fashioned muzzle-loading muskets. The pictures of the company's boys in the service are also being shown. There are nine boys. They are Musician Edward S. Brown, 5th Pioneer Band, Camp Wadsworth, S. C.; Corporal Roger Karcher, 116th Company, Marine Barracks, Virgin Islands; Private Edward L. Strople, 321st Field Artillery, somewhere in France; Private William B. Peach, 319th Machine Gun Battalion, somewhere in France; Private James J. O'Neil, Aviation Corps, Kelly Field, Texas; Private Hardy B. Tarr, Aviation Corps, Dayton, Ohio; Private Alfred C. Tarr, Depot Brigade, Camp Devens; Private Robert Karcher, United States Marines, Paris Island, S. C.; Seaman Alfred Jedrey, U. S. S. Seattle. The pictures of each of the boys are encased in novel individual photo holders in the form of a service flag, and each bearing the service star. The display has attracted an unusual amount of attention, both because of its attractiveness as well as the fact that all the pictures are of boys who have hosts of friends. The idea of the unique display, at once patriotic, thoughtful and attractive, was conceived and executed by Homer R. Marchant, foreman of the service of the company.

THE MANUFACTURERS LIGHT & HEAT COMPANY, of the Bridgeport, Ohio, district, came to the front in the Red Cross war fund drive and in a patriotic spirit gave one day's wages to the fund. As a large number of men are employed by this concern it means several dollars to the fund of the Red Cross.

PROF. LAUDER W. JONES, head of the University of Cincinnati Chemistry Department, shortly will take up his duties as director of the Chemistry Division of the Gas Offensive Department, Washington. Professor Jones' work will consist of researches in poisonous gases and means of protection against them.



NEWS OF THE GAS INDUSTRY



Gas Range Company Uses Trade Acceptance

That trade acceptances are becoming popular among customers is shown by the large number that have been signed by customers of the Philadelphia Gas Range Company, Thirteenth and Arch Streets. When these commercial papers recently came into more common use advocates of them urged that the consumers be educated to use them. Campaigns were started along this line.

More than 100 signed trade acceptances have been accepted by the above firm and many have already been paid. It appears that when the customers who gave trade acceptances for a part of their accounts are notified by their banks that the acceptances are due there is an immediate response by the customer. It is said that it has been found more satisfactory to both the seller and the buyer to use the trade acceptance rather than the open account, and customers seem better satisfied when they receive a notice from the bank that the acceptances are due rather than a letter from the buyer saying that the account is due.

The method which has been placed in operation has been a large means of promoting business and a member of this firm predicts that these commercial papers have come to stay and will prove a big factor in financing their business.

Government Needs Operatives in Gas Manufacture

An urgent call for high-grade technical men and skilled operators to fill war positions in industrial establishments is made through the civil service by the United States Army ordnance.

Operatives in gas manufacture—men to operate and control the processes of production of water gas and producer gas are urgently needed by the army ordnance. Applicants for these positions are paid $1,600 to $2,400 a year, and must have had at least five years' experience if high school graduates, or ten years' experience if their education has been only a common school education.

Salaries ranging from $1,600 to $2,400 will be paid junior mechanical engineers on high-pressure apparatus who wish to do their bit in winning the war by working for the Ordnance Department. Experience in the operation and control of high-pressure hydraulic and gas machinery is necessary. At least one year of such experience will be required of graduates in mechanical engineering courses from recognized colleges. Four years' experience is required of high school graduates.

Permission to Issue Bonds Requested By Springfield Utilities

The Springfield Utilities Company petitioned the state utilities commission for permission to issue two blocks of 5 per cent gold bonds, one block of $75,500 and one of $107,000.

The $182,500 is needed by the company to pay off notes given by the company for money borrowed since Dec. 31, 1913, and used for improvement of the company's properties in the city, according to General Manager A. D. Mackie. The improvements made through use of the borrowed money are of a permanent nature, and increase the physical valuation of the property.

The improvements include seven new street cars for the Fifth Street line, at a cost of $49,000, extensions and turns built at either end of the Fifth Street line, building of the line to Bergen Park, extension of gas mains, installation of gas meters, and improvement of the company's equipment for electric lighting and power service.

Appraisal of the utilities company's physical property now is being made at the direction of the State utilities commission, according to Mr. Mackie. The gas properties already have been appraised.

Commission's Indication That Indianapolis Company's Securities Should Have Been Offered on a Wider Market Replied to By General Manager

J. D. Forrest, general manager of the Citizens Gas Company, of Indianapolis, has issued a public statement in regard to the recent order of the Public Service Commission of Indiana, in which the company was authorized to issue $1,500,000 of securities to sell at 90 per cent of par, and in which the commission indicated that the securities should have been offered on a wider market than had been the case.

Mr. Forrest's reply follows:

I beg to submit a brief statement of the facts in the case.

The report states that the evidence shows that the company had arranged to sell its new short-term bonds at 85 or 86 and that the commission had forced it to make a better bargain, thus saving the company, and ultimately the gas consumer, a substantial sum. Since all of the evidence before the commission was given in my own statement, I think I am qualified to state the facts correctly.

At the hearing on the gas rate increase question I stated that it was the purpose of the company to finance the costly new construction by issuing $1,500,000 7 per cent notes, maturing in one to five years, and that they would probably have to sell at 85 to 86.

The company did not at that time have any contract with bankers to take these notes, and never had any contract except the one which was approved by the commission, and which was made by representatives of the company without any aid from the commission. At the time of the gas rate hearing we had a proposal from our bankers to take such notes at a price which would have averaged about 86, and that was the best proposal then before it. It was not,

however, the only proposal, as my testimony shows. The same bankers had offered to take two-year notes from us at 95 or 96, and all other prominent financial men with whom I talked told me that the best financial plan under present conditions would be the issue of two-year 7 per cent notes. However, we knew that we could not pay them off in two years, and we knew that their refunding would entail another discount, and perhaps come at a time of even greater financial strain. Therefore, the board of directors decided that it would not sanction the enlargement of the plant unless safer (but not necessarily cheaper) financing should be possible.

We had another offer of financial help at even cheaper terms than those just mentioned. The United States Government offered to advance us $600,000 at 7 per cent, without any discount at all. However, the Government would have required the return of the entire advance in two years and imposed other conditions which would have made it impossible to raise the rest of the money for the funds required. Therefore, this offer was also declined, although the Government had gone so far as to embody it in a contract which it was ready to execute.

In our minds safety was a far greater consideration than cheapness in this financial transaction. After the gas rate increase was authorized, we undertook to negotiate a definite contract for the funds, having as our object the obtaining of the most favorable present discount possible, and also the greatest postponement of maturities of the notes. With respect to the latter we made a vast improvement over any original proposals or any suggestions made by the commission or anybody else. Two-thirds of the notes will fall due in the fourth and fifth years, thus giving us opportunity to refinance under the most favorable conditions that could now be expected. And none of the notes fall due at the end of the first year. With respect to cheapness, we cannot say whether the contract which we have made and which the commission has approved is better than the offer of 86 or not. We sell the notes at 90 and give the bankers a contingent fee besides. The latter is the promise of 10 per cent of the profits from the new equipment for the first year of its operation. This may amount to more or less than the four points which we save in present discount, but it has this element of safety: It provides the company with larger funds at present and the additional expense will not be required until the earnings make it easy to bear. The bankers may make more under this plan, but the present advantage to the company is greater.

Now it has also been reported that the company did not negotiate with local brokers or larger bond houses. The former statement is true, but the latter is true only in a modified sense. Discussions of the proposed financing were had with representatives of several large financial institutions, but it was quite apparent that none of them would have taken the kind of securities which the company could offer at all, or at any rate on as favorable terms as those obtained. Negotiations were not carried farther because it was apparent that they would have been fruitless, and, meanwhile, the waste of time would have made it impossible to undertake the improvements this year.

We did not negotiate with local brokers because we knew they could not handle the notes as we required. We have to get the money when we need it and we shall need large sums rapidly. We sold bonds to a local syndicate in 1913 and it was not able to take them as it agreed. We were forced to borrow at our bank and extend the time of the syndicate. It would be the height of folly to take such a risk now. Our bank would not be permitted by law to lend us more than $300,000. We need more than $1,000,000 for quick work now. If the brokers could not sell our bonds they could not pay for them, and our bank could not carry us along as it did in 1913. If the Indianapolis banks or trust companies had been willing to buy our notes, of course, we should have been safe, but they decided that they required their funds for the commercial needs of the community and could not tie them up in construction work. They were right. Indianapolis needs all the banking resources it has. Expanding business and high prices make it necessary for the business man to borrow larger sums. To carry on our larger operations the gas company will have to borrow more heavily than ever before.

It may interest the public to know that if we can accumulate ninety days' coal supply (which we should have by December 1 for safety next winter), we shall have more than $1,000,000 tied up in our coal pile. Our present financing will not enlarge our working capital, so we must earn it or borrow it.

We hope to earn some of it, but we know we must borrow some also. Therefore, we fully appreciate the unwillingness of our Indianapolis banks to tie up their funds in our new plant, and we are sure that we have served our community best by obtaining funds elsewhere, while at the same time making the best and cheapest bargain for ourselves.

Princeton Utilities Company Takes Over Consumers Plant

The Princeton (Ind.) Utilities Company, a corporation composed of the directors of the Citizens National Bank, of Evansville, has been formed for the purpose of taking over and operating the plant of the Consumers Gas Company, of Princeton.

The articles of incorporation show the following directors for the company: J. C. Johnson, S. T. Heston, H. E. Bacon, J. L. Knauss, Jabez Wooley, S. L. May, F. W. Lauenstein, O. W. McGinnis, R. K. Vickery, William Laval and J. B. Graham.

The capital stock of the corporation will be $40,000, and $60,000 in 6 per cent bonds will be issued to be applied in the purchase of the plant and for a number of improvements that are to be made.

The Consumers Gas Company was recently bought in at receiver's sale by the Citizens Bank of Evansville.

Gas Range With Slot Meter Installed in Park for Basket Parties Proves Profitable Business for Redlands Company

In the city park at Redlands, Cal., picnickers bring their lunch baskets and coffee pots, but are not allowed to build campfires. In one corner of the park the Citrus Belt Gas Company has therefore installed a gas range. Beside the range is a specially designed slot meter. The picnicker drops a nickel in the slot, starting a clockwork mechanism which causes the gas to flow through the meter to the range. The gas may then be turned on at the range and used in the regulation manner for a period of five minutes. The device has proved to be a popular one as well as a profitable one for the gas company.

Salt Lake City Company Granted Increase

On June 1 the Public Utilities Commission of the State of Utah authorized an increase of 20 cents per 1,000 cu. ft. in the gas rates of the Utah Gas & Coke Company, of Salt Lake City, Utah.

The authorized rate is as follows: First 2,000 cu. ft., $1.20 per 1,000; next 20,000 cu. ft., $1.10 per 1,000; all over 22,000 cu. ft., $1 per 1,000. A discount of 10 cents per 1,000 cu. ft. will be made when payment is made within ten days from date of bill. The above increase in rates was effective June 1, 1918.

This JOURNAL is indebted to George H. Waring, general manager of the company, for the foregoing information.

E. J. Ward, Vice-president of the Peoples Company, Gets Hearing in Refund Case

Prosecution of the city of Chicago's claim that the Peoples Gas Light & Coke Company owes consumers approximately $10,000,000 overcharges has been resumed before Circuit Judge Torrenton.

Donald R. Richberg, the city's special counsel, by virtue of the city council having overridden Mayor Thompson's veto of his being retained three times in three weeks, is handling the case. Judge Torrenton recently upheld the council's contention that Corporation Counsel Ettleson was without authority to dismiss Mr. Richberg, as he tried to do.

Reference of the case to a master in chancery to take evidence on the value of the gas company's investment was asked by attorneys representing the company. Mr. Richberg opposed this on the ground that a more speedy decision would be reached by the direct presentation of evidence in open court. "Not only the refund of $10,000,000 in question, but the basis on which all future gas rates in Chicago are fixed will be determined in this case," he said. The court agreed with him.

On the second day of the hearing E. J. Ward, vice-president of the company stated:

That the company gets an average of 300,000,000 cu. ft. of 10-candle-power gas monthly from the By-Products Company, for which it pays 7 cents per 1,000 ft.

That it gets an average of 115,000,000 cu. ft. of gas of 25-candle-power monthly from the Public Service Company of Northern Illinois, for which it pays 45 cents per 1,000 cu. ft.

That the company's increase in business the first four months of this year was 100,000,000 cu. ft. more than the increase for the entire year estimated.

That the company will derive sufficient revenue, if the increase is granted, to meet operating expenses, pay interest on $46,000,000 indebtedness and dividends on a capital stock of $38,000,000.

That the company's $46,000,000 indebtedness largely is liabilities of companies it has purchased.

That the company, because of its subsidiary concerns, such as the Economical Fuel Company, the Mutual Fuel Company, the Universal Gas Company and the Ogden Gas Company, has as many as four duplications of gas mains and generating plants in some parts of the city.

The company is sending out literature explaining its position to all its customers. An extract from its statement follows:

"In 1917 gas-making materials cost us $3,500,000 more than in 1916. This year they will cost $2,500,000 more than last year. Your butcher, grocer and milkman cannot sell in war-time at the old prices. Neither can your gas company."

The statement closed by saying that last year the company lacked $365,000 of earning its bond interest.

Brooklyn Company Now In New Home

The Brooklyn Borough Gas Company is now located in its new home, West Seventeenth Street and Railroad Avenue, Coney Island. The building is two stories high and has a 40-ft. front, while it runs about 100 ft. in length. The plot running northerly to Mermaid Avenue, the property of the company, has been graded and sown with grass seed. In the center of it a flag pole will be erected and several flower beds laid out.

The building might be well termed a miniature White House. Although very plain, exceptional taste has been shown in architecture, color scheme and layout. The building is painted a pure white, while the trim is done in a deep bottle-green. The interior is finished off in a light buff. Much attention has been given to ventilation, as at every few feet on either side of the four sides of the building there is a window.

The general business office, with ample space for the display of stoves and gas appliances, is located on the first floor, as is the offices of the office manager and the general manager. There is also a wash room on this floor with several showers. Above is situated the bookkeeping department and the office of the superintendent. A rest room and kitchen for the employees is found in the rear of the building, as well as wash rooms and showers.

New Jersey State Gas Association to Hold Mid-Summer Meeting

The New Jersey State Gas Association contemplates holding an extra meeting during the mid-summer, which will be a get-together affair, offering the members an opportunity of enjoying a pleasant day with their associates. There will be no formal program arranged, but after luncheon has been served, an informal talk will be arranged for, at which the current problems of the gas man will be discussed.

For the purpose of selecting a place and making arrangements a committee was appointed, consisting of H. H. Newman, chairman, Trenton, N. J.; Jacob B. Jones, Bridgeton, N. J.; F. R. Cutcheon, Long Branch, N. J.

The association is in a very prosperous condition, and had a very successful meeting during the month of April.

It is the purpose of the officers and directors to further the interest of the gas industry to the fullest extent of their powers. The secretary, B. Kay Johnson, is in a position to help the members of the association by securing information that they may require in connection with their business, and is very willing and desirous to do so.

Communications addressed to Mr. Johnson, P. O. Box 126, Orange, N. J., will receive prompt attention, as he will put the inquirer in touch with the member of the association who will be in a position to give the necessary information.

The association will hold a meeting in October, 1918. The place and exact date not as yet decided upon.

DONNING THE PROTECTING MASKS

READY EITHER FOR THE FUMES OR THE ENEMY

Fighting Through Poison Gas

Press photographers have not been popular at poison gas drills at the army cantonments. Recently the veil has been raised in a drill by Camp Sherman cantonment men at Cincinnati. The accompanying illustrations should be very interesting to gas men, since many of their fellow workers have gone into the service to handle and combat these gases.

LAUNCHING THE POISON GAS WAVE

Stapleton Activities May be Hampered by Curtailment of Gas Supply

Real Estate and allied interests in Staten Island are greatly agitated over the possibility of a gas scarcity in that section of Greater New York next winter. Should such a condition be brought about not only would great and almost irreparable injury be inflicted on them, they say, but the Government's program for military base hospitals, for shipbuilding and to that extent for the conduct of the war against Germany and for the welfare of the nation itself would be affected adversely.

The several large commercial industries on the island such as the dye works, manufactories for synthetic rubber, refrigerating plants, etc., would suffer so seriously that in some cases they might even be compelled to close their doors. The newly established residential districts, which have been appealing in vain for gas, would be forced to abandon all hope of obtaining that necessary adjunct to a comfortable existence, and further expansion of building on the island would be brought to a full stop. Even as it stands the present domestic consumer will be fortunate if he can obtain enough gas to meet his requirements in the winter months.

The menace of gas dearth on the island is the outcome of the inability of the New York & Richmond Gas Company to obtain the funds necessary to the increase of its capacity to meet the growing demands of the community, to say nothing of the additional requirements for the base hospitals for wounded American soldiers, and the needs of the thousands of workers in the shipyards for whom the United States Government is arranging to build homes.

So grave is the situation that an appeal is to be made to the President of the United States.

The basis of the company's financial trouble, the managers of the corporation say, lies in the attitude of the public service commission for this district toward an arrangement the company had made for refinancing itself and prior to the declaration of war by the United States against Germany. The commission refused its assent to that arrangement because it objected to the original financing of the corporation in the days prior to the existence of any public service commissions in the State.

As an outcome of that the company

ARMS READY FOR ACTION—THROUGH THE POISONED GAS AREA

finds itself without the funds necessary to increase its capacity to meet the public and governmental demands upon its works, and without any means of obtaining them. It cannot issue new securities except with the sanction of the public service commission, but even if that could be obtained now it is doubtful whether the securities could be sold in the open market because the company at the present time is conducting its business at a loss. Its only recourse, therefore, is the War Finance Corporation in Washington and the Capital Issues Committee. To those it is understood it intends to apply to enable it to spare the island the suffering that otherwise it may have to undergo.

Because of the increase in the price of materials and of the advance in wages due to the war the cost of producing gas at this time, the company declares, exceeds by about 3 cents per 1,000 cu. ft. the price it obtains from the consumer, or, in other words, the price fixed by law. That condition, the company's officials say, "has deprived the company of funds available from any direction, and has rendered it unable to provide additional plant capacity sufficient to meet the heavy demands for gas service occasioned principally by the shortage of coal, and which demand is likely to be supplemented by the requirements of Fox Hills Hospital, homes provided for shipyard workers, and the daily increasing needs of manufacturers and shipyards engaged both directly and indirectly in the production of materials and supplies essential to the successful conduct of the war.

Merchants and manufacturers on the island realize the necessity of aiding the gas company to obtain sufficient funds for the expansion of its plant before the winter sets in. So far as the business men on the island are concerned they have expressed through their Chamber of Commerce a willingness to pay a price for their light commensurate with the cost of producing the illuminant. Some of them have urged the gas company arbitrarily to increase rates, but that action is beyond the power of the corporation.

The following is a straightforward and manly and entirely honest statement of the position of the company in relation to its present situation:

The New York & Richmond Gas Company was organized in 1901. A mortgage upon the property and franchises of the company, in amount $1,500,000, was authorized, $1,000,000 of which was issued at the time of purchase to the sellers. The remaining $500,000 of bonds were issued from time to time to provide other extensions to plant and distributing system of the company. These bonds were exhausted in the year 1910 and extensions and improvements since that time have been made from earnings of the company. The bonds issued under this mortgage fall due in the year 1921.

During all its existence it has always promptly paid interest upon its bonded indebtedness and an average of 2 per cent on its stock.

In the year 1901, at the time when the mortgage executed by the gas company was made, there was no public service commission and no regulatory body limiting the amount of the mortgage or interfering with the free right of the company to make a mortgage in any sum in which it saw fit, nor was there any regulatory body limiting the capitalization of the company.

The price fixed upon at the time of the organization of the company for its purchase from the preceding company was a pure bargain and sale proposition and there was no rate then established by law, and the subsequent operations of the company and the earnings which were produced from its operations justified the price that was paid.

During the year 1916, in fulfilment of a moral obligation, the company commenced the extension of its distributing system to Grant City and New Dorp. Actual work was begun in March, 1917. The city of New York, through its commissioner of water supply, gas and electricity, insisted upon the company paying to an inspector appointed by the commissioner the sum of $100 per month. The company at that time was paying for another municipal inspector

and objected to the further imposition. On April 28 the City of New York commenced an action for an injunction and a temporary restraining order was granted, and work thereafter ceased. The company sought by negotiations with the said authorities to be permitted to continue the work. These negotiations failed and the work was completely stopped, and in August the directors of the gas company by resolution abandoned the work. Thereafter the public service commission initiated a proceeding to compel the gas company to make such extensions. Hearings were had thereon, and in December, 1917, an order was made by the commission directing such extension to be completed and in operation on or before May 1, 1918.

An application for a rehearing was made to the public service commission and denied.

In the latter part of the year 1916 the directors of the gas company decided to negotiate a new plan for a complete reorganization of the finances of the company. Such plan contemplated the making of a new mortgage, not limited in amount:

(1) To retire the outstanding obligations of the company which would mature in 1921.

(2) To reimburse the company for the expenditures made on capital account for the five years immediately preceding.

(3) To provide for improvements and extensions during the year 1917, which necessarily included the cost of the New Dorp and Grant City extension.

An application was presented to the public service commission for the execution of this mortgage and the issuance of bonds thereunder for the purpose aforesaid. The petition was filed in March, 1917. Hearings were thereafter had and the commission determined for informative purposes only that a physical valuation of the properties of the company was necessary. Such examination was made by the commission's engineer and consumed several months. In January, 1918, the commission made an order denying the company's application in toto. Thereafter the commission instituted a mandamus proceeding to compel the gas company to make the extension to Grant City and New Dorp. This proceeding was contested by the company and has resulted in a final order for a writ of mandamus.

The company in its answer set forth among other things as a reason why it should not be compelled to make such extensions a lack of funds, and also the denial by the commission of the right to issue securities to make such extensions. This contention was stated by the court to be entirely immaterial and insufficient. The phenomenal situation therefore exists on the part of the commission in a peremptory order, in trying to force the fulfilment of this order in the making of this extension in one proceeding, and in another, unqualifiedly denying the right to issue securities to make the extension which it so strenuously urges should be made.

The gas company has instituted a certiorari proceeding to review the action of the commission in directing the Grant City and New Dorp extension to be made. It likewise is appealing from the order issued in the mandamus proceedings to compel this extension to be made.

School Board Awards Fuel Contract to Boise Company

Contracts for fuel were recently let to the Boise (Idaho) Gas Company for the heating of the Boise schools during the coming winter by the school board. A representative of the gas company was sent to Salt Lake to figure on a possible solution of the heating problems confronting the school board.

Through this source a satisfactory figure was reached that, it is figured, will save the school board at least $1,000 during the year.

According to the contract let, coke and coal will be combined in the heating of the schools. This combination has been used before during fuel shortages, and has been declared a success, and by making the combination of coke and coal, it is figured a material saving will be made of at least $1.30 per ton on what coal is needed. The contract on coke is considered very reasonable also.

Gas Sales Association of New England Holds Annual Meeting in Boston

(*Continued from page 571.*)

Intermittent Heating First Step in Developing House Heating Business

House heating may be divided into two general classes: First, all season heating; second, intermittent heating. These classes may be further subdivided into the character of appliances used. These sub-divisions will be considered further on.

A study of the reports of the committees on house heating of the American Gas Institute and the National Commercial Gas Association will show that this subject has been given very careful consideration and that the recommendations have generally called for commencing the work in any one community by endeavoring to make installations for intermittent heating.

By intermittent heating I mean the heating during the intermediate seasons of spring and fall, and as this problem has been generally considered for residence heating it will be seen readily that this is a logical method of developing the business.

Residence heating is practically twenty-four-hour heating. This means a steady load, and during the winter season, when a considerable quantity of heat is required, a steady fire at a fairly high rate of combustion is a very satisfactory means of burning coal while it is not particularly advantageous for gas.

On the other hand, during the intermediate season, when intermittent heat is required, say, for a few hours in the morning and a few hours in the evening, or during the entire day for a part of the week, and none at all during other days, a coal fire is very inefficient because it is running at such a low rate and fuel is often wasted to keep the fire burning in order to save the trouble and annoyance of rebuilding the fire. Under such conditions gas is an ideal fuel because the rate of combustion is so easily increased or when desirable entirely stopped.

I thoroughly believe that it will pay all gas companies to encourage building heating during the intermittent season not only because the economies of gas show up best at that time, but because it will bring about a relatively slow increase in the heating load which, it seems to me, is desirable from the standpoint of gas manufacture and distribution.

Granting that this is the best means for getting the heating business started, it is necessary to decide on the type of appliance which should be used in connection with the solid fuel heater. Recommendations for gas-fired heaters to be used in connection with hot air, hot water or steam may be found in the reports of the house heating committees of

the American Gas Institute and the National Commercial Gas Association. Some of these heaters have been installed and have given satisfactory results, but, unfortunately, no gas company has found it advisable to continue the experiments to the point where definite recommendations for certain of these appliances could be made.

Gradual Increase in Consumers' Period of Use

When I speak of manufactured gas companies I have particular reference to those where there is no especial low rate for gas. Where low rates are made it is possible to use appliances designed for natural gas modified slightly to meet the conditions of manufactured gas operation.

Experience seems to show that where the heating business is started in this way that during the first season the consumer will use gas until perhaps the first of November, and he will then again commence to use the gas perhaps the middle of March. The second season he will run his gas up to the middle of November and start it again the first of March. The third year he may run his gas up to the middle of December and start the use of gas again about the middle of February.

With properly designed appliances I think it will be found that the length of the gas season will increase until there will only be a short period during the middle of the winter when solid fuel will be used. Such a building up of gas consumption is so desirable because it is done at the option of the consumer and he is, therefore, likely to be better satisfied with the size of the gas bills.

All season heating with gas is being shown to be perfectly practical if such installations are only made where a study of the particular conditions indicate that gas may be a proper competitor of solid fuel. Examples of this are in cases of intermittent heat requirements.

Churches, lodge rooms and similar buildings require heat on only one or two days a week.

Loft buildings used, for instance, for light manufacturing purposes, should be good prospects because of the varying character of occupancy; for instance, the tenants of the first floor may wish an average temperature of 75 deg., the second floor an average temperature of but 50 deg., while the requirements of various tenants may vary in this way, and may also vary individually from time to time, because of the amount of work on hand.

Heating the Loft Building

The owner of a loft building must install a heating plant large enough to take care of the maximum requirements for all tenants. This means a large initial outlay, and if it happens that the majority of his tenants only require a minimum amount of heat then his plant is operating inefficiently. Vacancies of floors must be considered, as where floors are vacant it is obvious that no heat is required.

A logical installation for heating this type of building is to put in an individual heating plant for each tenant. This plant to be of such a size as will give the maximum amount of heat which may be required, but one which can be operated without loss of efficiency at a much lower heating rate.

In such a case, as each tenant pays for his own heat, there will be no complaint on the part of the tenant who requires a small amount of heat that he is paying in his rent for the heat of another tenant whose demands for heat are greater.

Such heating systems for both owners and tenants are very attractive to them, to the owner because it simplifies his dealings with the tenants, and to the tenant because he is not dependent on the owner to meet his particular requirements for heating. From the standpoint of the gas company it means a somewhat larger investment in meters, but we have never heard of any objection being made on this ground.

The heating of such buildings in this manner should be very attractive to combination plants, as with the steam heating system eliminated it is a difficult thing for any building owner to see any advantage in installing an isolated lighting plant.

Stores and Office Buildings

The next class of buildings suited for gas heating is that of stores and office buildings, where the heating requirements are more nearly uniform than they are in the previous classes, but where the heating periods are shorter than they are in residences, and the last class of buildings to be heated with gas is the residential class, where the heat requirements are of such a character that the differential in cost between gas and coal is usually in the favor of coal.

I do not mean that I think we should do anything to discourage the use of gas for residence heating; on the contrary, I believe that we should do what we can to develop it, but the sales expense of getting residence business is so much higher than the sales expense in developing the other classes of business, that I believe we should consider the buildings where intermittent heat is required and go from them to buildings where more constant heat is demanded.

The advantages of gas as fuel are so obvious that they can be passed over with the most brief reference to the decreased labor cost, cleanliness and uniformity of heat.

As an example of the simplification and attendance I may cite the case of a large church installation where not only was the church building heated, but also the very large parish plant connected therewith, the Sunday-school building, the chapel, guild rooms, music rooms, etc. If this church plant had been heated with steam or hot water and a coal-fired heater it would have been necessary to employ one fireman at all times and two firemen at certain times. This plant was operated during the past very severe winter by a sexton, who operated the plant in addition to his many other duties, and during a period of two weeks when the sexton was ill the entire heating system was operated satisfactorily by the cleaning woman.

Reducing Housecleaning 50 Per Cent

It is difficult to show any monetary saving because of cleanliness, but I think that I am safe in saying that the average housekeeper will find that housecleaning is reduced nearly 50 per cent when the cellar is as clean as the rest of the house, because of the absence of coal and ashes, which are always tracked up into the house when anybody goes to the cellar.

Similarly it is difficult to prove the monetary value of uniform heat, but it is obvious that where coal is used as a fuel the temperature variations are great, because the fire at one time is very hot while at another time it may be almost dead. Uniformity of temperature is very desirable, especially in residences where children or people who are not in robust health

may suffer greatly from the temperature variations.

In going into old buildings it is not always easy to show that the cost of installation of a gas appliance is less than the cost of a coal installation. In remodeled buildings or in new buildings it is often very easy to show a great saving in construction cost, because where gas is used it is unnecessary to provide the excavations for a boiler or heater and the expensive chimney for the carrying off the products of combustion. In the case of the church referred to above, the entire gas system was installed for a little in excess of 75 per cent of what a steam system would cost.

I received a letter from one of the members of the association asking that I say something about ventilation.

Ventilation

Ventilation is of prime importance in many buildings. The quantity of ventilation, however, is very difficult to determine.

I believe that the usual rule for ventilating auditoriums is that the air be changed not less than four times per hour. For buildings such as hospitals or in factories, where there are special vocational requirements, this rate may be as high as six to eight complete air changes per hour.

In the case of factories, auditoriums, store buildings, etc., it is possible to install a mechanically operated ventilating system which will insure the proper change of air. In the average residence, however, it is impossible to install such a system, both because the expense of installation and the necessity for attendance in operating. Residences are usually ventilated by opening windows, and they are often either over-ventilated or under-ventilated.

We all recognize the desirability of flue connections for gas-burning appliances. Products of combustion from a properly adjusted gas-burning appliance may pass into the ordinary room for an indefinite period without harm to the occupants, because in an ordinary room there is always sufficient leakage to provide enough air. The carbon dioxide from the products of combustion in itself is not harmful until it reaches very high proportions, I think as much as 25 per cent.

In a room crowded with people the proportion of carbon dioxide should be much lower, not because the carbon dioxide itself is harmful but because it is an indication of other excretions containing animal poisons which are very deleterious to health.

If gas-burning appliances are not properly adjusted, and because of incomplete combustion carbon monoxide is present, the atmosphere may be quickly diluted to such an extent as to be very harmful to health. This has been recognized by many gas companies and by the Bureau of Standards, which have recommended that blue-flame appliances be connected with flues because of the possibility of flashing back occurring and the consequent formation of carbon monoxide.

You may not be entirely familiar with the work which is being done by the house heating committee of the National Commercial Gas Association. Three years ago this committee decided that the interests of the gas companies for the development of house heating would be best served by giving to salesmen a list of actual installations which might be used by salesmen in taking up gas heating with prospects.

Classification of Buildings

Blanks were prepared and sent out to many gas companies throughout the country asking them for information on actual installations in their cities. The committee asked for sketches of the buildings, photographs, data on size of building, character of exposure, kind of system installed and gas consumption by months. It was hoped that the average cost of heating might be determined in cubic feet of gas per 100 cu. ft. of contents per season, this figure being considered to be the most convenient for the salesman in talking with a prospect.

The first year we had forty or fifty reports, the next year we had about 200, and we hope that this year there will be a still larger number from which we can say, for instance, that a frame residence, detached and exposed on all sides, will require a certain number of cubic feet of gas per 100 cu. ft. contents of the building.

Attention is being given to the classification of the buildings not only into kind of construction and the character of occupancy, but also into the location, as it is manifest that more gas will be required for heating during the season in the northern part of the country than in the southern part of the country. The character of appliance is also being considered, and while we have hardly enough examples yet we hope that before long we will be able to show the cost of general types of appliances, such as gasteam radiators, central hot-air plants, central steam plants, central hot-water plants, portable heaters of various types and other systems.

Portable Heaters

So far I have said nothing about portable heaters. As a class these are of the greatest possible value to the consumer, and the use of proper portable heaters should be encouraged. I think it is very doubtful if it will ever be possible, especially in residences, to install a system which will be adequate for giving the maximum possible demand for heating because of the high initial cost of such a system. During every heating season there will be very few days of exceptionally cold weather when a plant which is entirely adequate for average conditions will not properly heat one or two of the rooms of the house. The use of portable heaters to carry these peaks is perfectly logical, but they must be of a good type and the gas connections must be of such a character that there will be no elements of danger to the user.

The use of portable heaters for whole season heating does not seem to be justified if we consider as portable heaters those which have no flue connections. It is true that such heaters have a very high heating efficiency, as, of course, they deliver to the room 100 per cent of the heat value in the gas, but the ventilation of the rooms is sure to be unsatisfactory, not dangerous to health, but annoying to the occupants of the room.

Is Heating Desirable Business?

We often hear that gas heating is not desirable because of the character of the load curve, the peak of the heating curve coming at about the same time with the average peak of other uses for gas, and the load falling off entirely during a large part of the year.

A very interesting argument in favor of gas for heating has been advanced to me by the president of a large gas company, who called attention to the fact that the

investment in a gas plant might be divided into approximately from 60 to 70 per cent for the distribution system and 40 to 30 per cent for the manufacturing system. He called attention to the fact that while there might be some mains, services or meters which at the present time are loaded to their capacity that the average distributing system is being operated very much below its capacity, and he asked if it would not be good judgment on the part of gas companies to add a small per cent to their 30 per cent investment for the purpose of making their 70 per cent investment earn a greater return? This point is of interest to us, but, of course, it is beyond our province to express any definite opinion thereon.

Because of the falling off in coal production, particularly anthracite, and with the increase in coal gas plants and the demand for the various other products of coal carbonization, such as coke, tar, chemicals, dyes and drugs, it seems to me that the time is not far off when gas will be very generally used for heating purposes and that solid fuel requirements will be taken care of with the coke from these coal gas plants. I cannot see but what the logical fuels in the future will be gas and coke, and when normal conditions return to this country I look for tremendously increased demand for these fuels, and particularly for gas, which, aside from the question of comparative fuel expense, is without doubt a most ideal fuel.

Discussion

In reply to Mr. Webber's question as to why the new Rector system is better than the old one, the briefest reply that I can make is that the old one would not work and that the new one will work. Elaborating this somewhat, I wish first to say that the system which we are now putting on the market, which formerly was known as "the G. F. E. Rector System," is now known as the "Grinnell Ready Heat System," which uses Grinnell Ready Radiators.

There are several reasons why the old Rector system was not a commercial success:

1. The valve and its controlling mechanism were not reliable, diaphragms were tried and mercury was tried, but the design of both was somewhat faulty and expensive maintenance on the part of the consumer was required to keep them in good operating order.

2. The Rector system being operated as an exhaust system, was a sort of a vacuum cleaner system, and the dust from the atmosphere was drawn into the operating mechanism of the valve unless this was prevented by means of a strainer. These strainers would stop up from time to time and insufficient air would be admitted to give perfect combustion, so that at times the flame was of very poor quality and might be even extinguished.

3. Another trouble was that the exhaust or vacuum piping was not properly sized and was not protected against corrosion, which, of course, is bound to occur where the products of combustion are condensed and of a slightly acid character. Another annoyance was the over-heating of certain parts of the radiator, for which inadequate protection was provided.

Since we have undertaken the reconstruction of the radiator the valve has been improved so that it is now entirely reliable. Mercury is not being used, the operating mechanism being by means of a bronze diaphragm or by a rubberized fabric, the diaphragm fabric being similar to that used in player-pianos. This is proving entirely reliable, and being much more flexible gives a valve which does not require the care in original adjustment needed with the bronze diaphragm.

The strainer for the air supply has been given a very much larger area, made more convenient to clean and the valve construction is such that if the supply of air is inadequate for proper combustion the valve will not open.

Our data sheets have been worked out by means of a computer so that the sizing of vacuum piping is now simple and gives the correct operating results.

The vacuum piping is also protected by a simple application of paint so that corrosion of the pipe is prevented.

An ornamental grill has been provided which adequately protects the extremely hot parts of the radiator from ready contact therewith by persons or objects.

As an indication that this system is now satisfactory for operation, not from a theoretical standpoint but from a practical standpoint, I may add that during the past season we have had no complaints whatsoever from the operation of the system, except in two or three cities where the gas conditions were such that proper operation could not be expected. These gas conditions were the result of the coal shortage, and while we do not anticipate that similar conditions will exist during the coming winter we have made such modifications in the pilot (which was the part most affected) as to lead us to believe that no further trouble will be experienced, even when the radiators are installed under the most adverse gas conditions.

A Correction

E. E. Austin, of Sumter, S. C., was mentioned as having been elected president of the Southern Gas Association on page 526 of the June 1 issue of the American Gas Engineering Journal.

This report is erroneous, and a correction is desired. Luther Gaston, new business manager of the Knoxville (Tenn.) Gas Company, was elected president of the association for the coming year. Mr. Austin was elected a director for the ensuing two years.

Permission to Raise Rates Granted Manufacturers Company

The State public utilities commission, acting upon application of the Manufacturers Light & Heat Company, with main offices at Pittsburgh, granted an increased gas rate to this corporation.

The increase means a rate of 35 cents per 1,000 cu. ft. less 2 per cent, instead of the present rate of 30 cents per 1,000 cu. ft. less 2 per cent.

Philadelphia Surburban Files New Schedule of Rates

The Philadelphia Suburban Gas & Electric Company recently filed with the public service commission a new tariff of rates for the distribution of gas in Pottstown, Phoenixville, Spring City, Royersford and Mont Clare, effective June 10, making increases of 20 cents per 1,000 cu. ft. in the unit rates charged for gas.

The rate for the first 5,000 cu. ft. per month is increased from $1.15 net to $1.35 net per 1,000 cu. ft.

Prepayment meters are to be set to deliver 180 cu. ft. for 25 cents.

Toronto Company Wants to Mix Natural and Artificial Gas As A War Measure

Considerable opposition led by Mayor C. R. Somerville has developed in Toronto, Ont., to the proposal submitted to the city council by the City Gas Company for permission to mix natural gas with the artificial product produced by the company. The company has asked the right to use a 30 per cent mixture of purified natural gas as a war measure. The claim is that the high cost of fuel, both coal and fuel, during the past winter, caused heavy loss to the company.

Officials of the gas company assert that with all manufacturers cut off from the use of natural gas after July 1, there will be plenty of gas for domestic use. They also claim that there were 4,000 homes in London last winter which had no other fuel but gas for months, and that in view of this fact special concessions should be made.

Ames Gas Supply Cut Off for Several Hours Due to Flooded Plant

As a result of a flooded plant, the Public Service Company, of Ames, Iowa, was unable to supply its consumers with gas June 5, but with the receding of the water the supply was resumed by evening.

Quebec Company Granted Increase

The Quebec council May 31 ratified the agreement arrived at by the finance committee and the representatives of the Quebec Railway, Light, Heat & Power Company, Quebec, Canada, with regard to the increase in the gas rates.

Only one amendment was made to the agreement and that was at the request of the company. The finance committee had stipulated that the contract was for a year, but the company in a letter to the council pointed out that a year was not long enough, and if the company was not given a fair opportunity to cope with the increasing cost of material they might be forced to cease manufacturing gas altogether until the war was over.

It was therefore decided that the company may charge $1.25 per 1,000 cu. ft. of gas with a minimum charge of 75 cents a month for a period extending one year after the termination of the war.

Two Flags on Display in Gas Company's Window At Springfield

The United States flag and the flag of the Confederate States of America hung side by side in one of the big show windows of the Springfield Gas & Electric Company, southeast corner of Fourth and Monroe Streets, Springfield, Ill., recently, emphasizing the unity of the nation now.

The United States flag was a new one of cotton. The Confederate flag was the famous "stars and bars," the first flag adopted by the Confederacy and afterward supplanted by the battle flag, the familiar flag with red field, blue St. Andrew's cross, with white stars within the cross. The flag in the utilities company's show window was a faded old flag of silk, red, white and red bars, with a blue field with fourteen white stars in it, so faded that the two red bars have lost all semblance of their original color. It is the property of R. W. Stuckwell, superintendent of new business for the Springfield Gas & Electric Company. His father was colonel of the Third Missouri infantry of the Confederate army, whose flag the old banner was, and it was carried at the battle of Missionary Ridge, one of the greatest battles of the Civil War.

Doherty Managers in Convention

The perplexing problems connected with the operation of public utilities at the present time were discussed at length by the managers of the Doherty properties on May 16-17, following the celebration of Henry L. Doherty's forty-eighth birthday, at the Grand Central Palace, New York City.

The sessions, presided over by Milan R. Bump, chief engineer, naturally were more for an interchange of experiences, rather than an attempt to lay down any hard or fast rules for public utility operation in the second year of the United States' entrance into war. Frank W. Frueauff, in complimenting the managers on their handling of the last twelve months' problems, reminded them that far greater ones lay before them in the next few years.

The most important and the fullest discussions were on the questions of adequate rates and labor. The recital of various rate increases allowed Doherty properties, it is felt, will serve as a further inspiration to the managers to strive for further reforms along this line.

Mr. Doherty spoke particularly on this subject, and told the managers they "had no reason to feel squeamish about asking for rate increases that would be adequate to pay their men the salaries demanded by the times, as well as the increased costs of operation." He advised pushing the Doherty, or readiness-to-serve, rate whenever possible.

"Moreover, we must get rid of candle-power standards for gas, which are a perfect absurdity," he continued. "Gas should never be used for illumination except with mantle lamps. As only about 1 cu. ft. in every 1,000 cu. ft. manufactured is used in open-tip burners, it is unreasonable to demand that we enrich all gas for a candle-power standard."

Holton H. Scott, general manager of operations, asserted that public utilities had a brighter future than ever, because of the extensive work done in educating the public and officials as to rates and costs. It was also the time, he said, to work for the elimination of unfair ordinances and the securing of new franchises.

Mr. Scott related how the Kansas Natural Gas Company, now a Doherty property, had futilely attempted to secure increased rates by negotiation. Mr. Doherty changed the policy, took the matter into court and got an increase of 150 per cent, the rate being 60, as against 25 cents per 1,000 cu. ft. Complaints from customers have been practically nil.

Finance was, naturally, an engrossing topic, and the use of trade acceptances was urged by L. R. Musil, treasurer of the Cities Service Company. A number of the managers testified to having used these acceptances with success.

"From a patriotic point of view the question of trade acceptances is certainly desirable," said Mr. Musil. "This system has been utilized by the Federal Reserve Banks to open up the use of credit to a much larger number of persons as well as those familiar with the system. Flexibility of currency is certainly desirable at this time, and anything that opens possibilities to us also means aid to the Government."

Application Filed by Winston-Salem Company for Increased Rate

The Winston-Salem (N. C.) Gas Company recently filed an application with the corporation commission for permission to increase gas rates 10 cents a thousand. The company alleges labor, fuel and everything that enters into the production of gas has advanced 75 to 138 per cent.

Tacoma Company Secures Large New Gas User

Elmer Dover, president of the Tacoma Gas Company, recently announced that they are continually adding large consumers to their lines, and during the past week signed a contract to connect a new galvanizing plant which will consume between three and four hundred thousand cubic feet of gas per month. At the present time there are two galvanizing plants operating, both of which are using gas.

Increase Granted Taylorville Company

Gas rates in Taylorville, Ill., were recently set by the Illinois Public Utilities Commission. They were the result of a petition filed by the Central Illinois Public Service Company of Mattoon asking for an increase.

At a hearing on the petition the commission ordered the following rates to prevail for one year, beginning May 1, 1918, unless otherwise changed:

Minimum bill per meter per month for gas not used in excess of 350 ft., 50 cents net.

First 2,000 ft.: Gross, $1.50; net, $1.40.

Next 1,000 ft.: Gross, $1.35; net, $1.25.

Next 1,000 ft.: Gross, $1.25; net, $1.15.

Next 1,000 ft.: Gross, $1.15; net, $1.05.

Next 5,000 ft.: Gross, $1.05; net, 95 cents.

Next 15,000 ft.: Gross, 95 cents; net, 85 cents.

Next 25,000 ft.: Gross, 85 cents; net, 75 cents.

Over 50,000 ft.: Gross, 75 cents; net, 65 cents.

Consumers using pre-payment meters will be charged at the net rate of $1.15 per 1,000 ft.

The company's request for a surcharged bill of 25 cents per consumer per month in addition to the minimum bill was denied. The commission held it to be inequitable and that it would cause undue burden on small consumers.

A reasonable annual allowance for accruing depreciation was fixed at 8 cents per 1,000 cu. ft. of gas used.

Higher Rate Asked by North Carolina Company

The Tidewater Power Company recently filed a petition with the corporation commission asking for a higher rate for gas served.

Gas rates in Wilmington, if the petition is allowed, will be increased upon a base rate of $1.75 per 1,000 cu. ft., with 10 per cent discount, as now, for prompt payment of bills. At Wrightsville Sound and Wrightsville Beach the gas rate would be advanced to $2 per 1,000 cu. ft., base rate, with the same discount allowance for prompt payment.

Delaware Cities Pay Higher Rate for Gas

At a citizen's meeting Friday, May 17, to discuss the granting of a new rate to the Sussex Gas Company, Seaford, Del., it was decided to grant the new rate, which is $2 per 1,000 cu. ft.

Bridgeville, Laurel and Seaford all of which use gas from the Sussex plant, are now paying the new rate, which will go into effect at once.

Personal Notes

GEORGE A. OGLESBY, an experienced gas man, who has been in charge of large plants in Illinois, recently arrived in Junction City, Kan., to take active management of the Junction City Gas Company.

JAMES W. DUNBAR'S resignation from the United Gas & Electric Company, New Albany, Ind., which was mentioned in the June 1 issue of the AMERICAN GAS ENGINEERING JOURNAL, will become effective July 1. Mr. Dunbar has been with the company at New Albany ever since he was eleven years old, having entered the employ as a gas lamp lighter, his relation with the company extending over a period of forty-six years of continuous employment. He was secretary of the Western Gas Association in 1894-1906, secretary of the American Gas Institute 1906-1908, president of the Indiana Gas Association 1908-1909, and has been secretary-treasurer of the Indiana Gas Association since 1914. In January, 1914, he had the distinction of having been elected or holding three offices of public trust at the same time—Presidential elector elect for the State at large, school trustee elect in the city of New Albany and a member of the board of sinking fund commissioners for Democratic council and appointed sinking fund commissioner by a Republican mayor. He was Grand Master of Masons in Indiana in 1902.

VICTOR F. DEWEY, vice-president of the Detroit (Mich.) City Gas Company, has resigned that position, to take effect June 10. War-time conditions have made it necessary for Mr. Dewey to retire from his connections with the gas company in order to give closer attention to his other interests. In the eighteen years in which Mr. Dewey has been with the gas company he has risen from assistant chemist to vice-president. For a year and a half Mr. Dewey was vice-president and general manager of the Grand Rapids Gas Company. Mr. Dewey's successor has not been announced.

THE OHIO CITIES GAS COMPANY stockholders, at the annual meeting in Columbus, Ohio, re-elected the following directors: W. F. Burdell, B. G. Dawes, F. S. Heath and R. W. McIlvaine, of Columbus; John L. Bushnell, Springfield, Ohio; W. C. Fairbanks, Indianapolis; W. E. Hutton, Cincinnati; W. W. Mills, Marietta, Ohio, and N. H. Weber, of Philadelphia, and H. M. Work, of New York. The new director, H. N. Cole, of Tulsa, Okla., succeeds W. B. Bassett, of Tulsa. The board re-elected the old list of officers—B. G. Dawes, president; W. E. Hutton, R. W. McIlvaine, G. C. Scott, N. H. Weber and H. N. Cole, vice-presidents; F. S. Heath, secretary and treasurer; T. J. Jones, assistant secretary and assistant treasurer.

H. L. JACKSON assumed the duties in the engineering department of the Southern Counties Gas Company, Los Angeles, Cal., formerly performed by G. E. Steller, who entered the service.

ROBERT MCGILVARY, of St. Johnsbury, Vt., succeeds Arthur D. Foster as manager of the Dover, N. H., branch of the Twin State Gas & Electric Company.

D. C. GREEN, general manager of the Fort Smith Light & Traction Company, has been elected president of the Arkansas Association of Public Utilities for the ensuing year.

Queens Borough Company Wants Higher Rate

The Queens Borough Gas & Electric Company, which operates in Far Rockaway, Queens County and part of Nassau County, has filed with the public service commission tariff sheets announcing proposed advances in its maximum rates, effective June 1.

In the territory covered by the First District, the company proposed that gas rates be increased from $1.15 to $1.40 per 1,000 cu. ft.

The company claims because of the increased cost of coal, gas oil and labor it is compelled to raise its rates in order to furnish to consumers proper service and to make a fair return on its investment.

Construction Notes

Work on Extension of Brenham Mains to Begin Soon

George M. Moran, manager of the Southwestern Gas Company, Brenham, Texas, recently announced that the company would begin very shortly to make the long-needed extensions.

C. L. Brooks, the purchaser of the plant, has retained the services of Mr. Moran as manager, and the gas company will continue in operation. The work of extending the mains will be rushed to completion.

Additional Battery of Twenty-five Ovens Installed At Sault Ste. Marie

The Algoma Steel Corporation, of Sault Ste. Marie, Ontario, has decided to further enlarge its by-product coke oven plant, and a contract for an additional battery of twenty-five Wilputte ovens has just been let to the Wilputte Coke Oven Corporation, of New York City, making fifty new ovens now in process of construction.

It is expected that the two new batteries will be ready for operation late this year.

Improvements Being Made At Junction City

The Junction City Gas Company recently started the work on the new improvements that will be made in Junction City, Kan. One car of material that will be used has arrived and there will be no delay in getting the plant in shape to handle the business of a town of 15,000 people.

Increased Rate Necessary to Make Improvements to Natural Gas Plant in Order to Prevent Shortage

The Oklahoma Natural Gas Company, which supplies gas to forty-one plants in the State distributing gas for commercial use, is confronted with the problem of "double-staging" all its stations in order to increase the discharge of gas to prevent possible shortage. This statement was made by R. H. Bartlett, of Tulsa, secretary-treasurer of the Oklahoma Company, in the latter's application before the corporation commission asking that rates for gas distributed by the different plants be increased. Arrangements have already been made, said Mr. Bartlett, to double-stage the stations at Shamrock and Haskell and enlarge those at Tulsa and Bixby.

This will be necessary in the effort to effect sufficient supply of gas and keep the pressure up, but it will entail an additional expense.

Committee Recommends That Franchise Be Granted to Supply Little Rock Consumers With Gas

An ordinance was recommended to the Little Rock council by the public utility committee granting a franchise to Louis Lock to transport and distribute natural or manufactured gas in and through Little Rock for thirty years. It is required that within twelve months after the acceptance of the franchise he shall bring to the city limits of Little Rock, in a pipe line of sufficient size, natural gas in such volumes as to satisfy all reasonable demands and immediately thereafter begin to supply gas to the consumers. The gas is to be brought to the receiving station under a pressure of not less than 25 lb. per cubic foot, which is to be maintained throughout the life of the franchise.

For this privilege Mr. Lock is to pay to the city $2,000 for the second year thereafter as long as natural gas is supplied, and for each year artificial gas is supplied $500 per year.

The rate to domestic consumers is not to exceed 35 cents per 1,000 cu. ft. during the life of the franchise, the minimum charge being $1 per month. The rates to persons or corporations consuming by one service 1,000,000 cu. ft. or more per month is not to exceed 15 cents per 1,000 cu. ft.; those consuming by one service over 500,000 cu. ft. and less than 1,000,000 cu. ft. per month 20 cents per 1,000 cu. ft.; to persons consuming 100,000 cu. ft. or more and less than 500,000 cu. ft. per month, 25 cents per 1,000 cu. ft.

Mr. Lock is required to furnish a bond of $20,000, a solvent bonding company to be the surety, or a cash bond, that he will perform the conditions of the franchise within twelve months from the date of the acceptance of the franchise. He is given ninety days from the passage of the franchise ordinance in which to accept the franchise.

Unsuccessful in Securing Rate Increase Beatrice Plant Closes

The management of the Gage County Gas Light & Power Company, Beatrice, Neb., recently announced that as a result of the failure of the city commissioners to grant the company an increase of 20 per cent in rates as asked for, the company decided to close down its plant on the midnight of June 12. The company has been unable to meet expenses for the past two years owing to the increase in the price of coke and oil. A number of attempts on the part of the company to secure permission to increase its rates temporarily have met with a refusal on the part of the commissioners, the management announcing that the only relief obtainable now appears to be to close down the plant.

Northumberland Plant Sold

The Northumberland Gas Company, Northumberland, Pa., has sold its plant to George W. Rockell and H. J. Stannert, business men.